For the installer

Instructions for Installation and Servicing

turboMAX pro

Wall hung room sealed fan assisted combination and system boilers

24/2 E
28/2 E

GB

benchmark
The mark of quality for domestic heating

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1 List of contents

1.1 Contents included with boiler

Ensure that all contents are included before commencing installation.

Note!
DO NOT remove the boiler from the polystrene base at this stage.

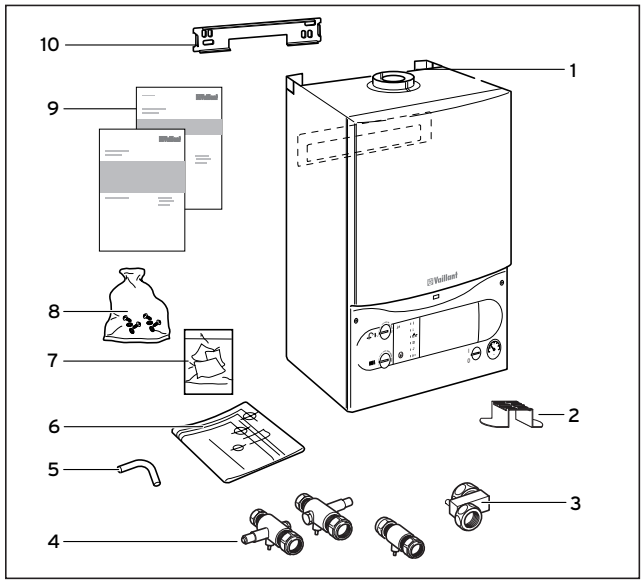

Fig. 1.1: Items supplied with unit (turboMAX pro)

Item	Quantity	Description
1	1	Boiler
2	1	Flue restriction ring
3	1	Cold water inlet valve
4	3	Flow and return service value, gas service valve
5	5	Copper tails for water outlet connection
6	1	Template
7	1	Guarantee Card
8	1	Installation and connection accessories and PRV packages incl. DHW outlet union nut
9	3	Installation and Servicing, Users and Flue Installation Instructions
10	1	Hanging bracket

2 Introduction

2.1 General Information

Note!
This boiler must be installed and serviced by a competent person in accordance with the Gas Safety (Installation and Use) Regulations 1998. In the UK „CORGI" registered installers undertake the work to a safe and satisfactory standard.

The turboMAX pro is a fully automatic, wall mounted, room sealed combination boiler for central heating and domestic hot water. Domestic hot water is supplied directly from the boiler, without requiring a copper cylinder, cold water tank, feed and expansion tank and associated pipework. Domestic hot water has priority over central heating. The boiler has been designed for use with a sealed central heating system, and comes fully tested and assembled with a built in circulating pump, expansion vessel and diverter valve.
The turboMAX pro has an output for domestic hot water of 24 or 28 kW. The boiler is easily sited on any internal wall and can be installed with either a horizontal or vertical RSF (room sealed fan assisted) flue. Two types of flue system are available, rear flue outlet, top outlet (with turret) concentric flue system (100 mm outside diameter) and an extended concentric flue system (125 mm outside diameter). Flue extensions and additional bends and elbows are available for both flue systems to increase the siting flexibility. The boiler is not suitable for external installation. This boiler is available in Natural Gas. An optional LPG conversion kit is available. If desired, an inhibitor may be used in the system. Guidance on the use of inhibitors is contained in these instructions.
The boiler contains a domestic hot water heat exchanger. The temperature in the heat exchanger is limited by the boiler control system and it is not necessary to install a scale reducer on the cold mains to the boiler. However, in exceptionally hard water areas to prevent scale formation in the property hot water system pipework, a scale reducer may be fitted.
turboMAX pro combination boilers have a built in diagnostic system which indicates the operational status of the boiler. This feature provides key information to aid commissioning and fault finding.

The data badge is fitted on the rear of the control panel. See text of General Requirements for installation requirements or notes.
Vaillant ltd. support the Benchmark initiative.
In this installation manual you will find the Benchmark gas boiler commissioning checklist. It is very important that this is completed correctly at the time of installation and commissioning..

Important!
When tightening or slackening screwed connections always use suitable open-ended spanners (not pipe wrench, or extensions, etc.).
Incorrect use and/or unsuitable tools can lead to damage being caused (e.g. gas or water leakage)!

2.2 EC designation

turboMAX pro (24/28) a carry the "CE" Mark. This demonstrates that the boilers fulfil the essential requirements of the Gas Appliance Directive(90/396/EEC) and the Gas Appliance (Safety) Regulations 1992.

The "CE" Mark also demonstrates that the boilers comply with the requirements of the Electromagnetic Compatibility Directive (89/336/EEC), the Low Voltage Directive (72/23/EEC), the Boiler Efficiency Directive (92/42/EEC) and the Boiler (Efficiency) Regulations 1993.

3 Boiler Specification

3.1 Technical Data

	turboMAX pro 24/2 E (VUW GB 242/2-3)	turboMAX pro 28/2 E (VUW GB 282/2-3)	Units
Maximum CH heat input (net)	29.7 (101.000)	31.1 (106.200)	kW (Btu/h)
CH heat output range (80/60 °C)	8.9 - 24 (30.400 - 81.900)	10.4 - 28 (35.500 - 95.500)	kW (Btu/h)
Maximum DHW heat input (net)	26.7 (91.200)	31.1 (106.200)	kW (Btu/h)
SEDBUK Band	D	D	
SAP Seasonal Efficiency	79.6	79.7	%
DHW heat output	24	28	kW
DHW flow rate ←T = 35 °C rise	9.8	11.5	l/min
DHW flow rate at factory set temperature rise (←T 42 °C)	8.2	9.5	l/min
Mains water pressure required for max. flow rate	0.5	0.5	bar
Minimum water flow rate	1.5	1.5	l/min
Mains water pressure required for min. flow rate	0.15	0.15	bar
Maximum inlet water pressure	10	10	bar
Inlet gas working pressure required (natural gas)	20	20	mbar
Gas supply (G20) Gross CV (s.t.)	37.8	37.8	MJ/m^3
Gas burner pressure max. rate (natural gas) G 20	9.8	10.8	mbar
(LPG 3+) G 30/31	28 - 30/37	28 - 30/37	mbar
Gas burner pressure ignition rate G 20	1.9	1.8	mbar
G 30/31	3.9/5.4	3.8/5.3	mbar
Gas rate max. (DHW) -	2.8	3.3	m^3/h
CH temperature flow range	35 - 82	35 - 82	°C
Minimum CH water flow (for 20 °C rise)	1032	1203	l/h
Pump pressure available	0.25 (25)	0.25 (25)	bar (KPa)
Expansion vessel pre-charge pressure	0.75	0.75	bar
Maximum CH system pressure	3	3	bar
Weight	42	45	kg
Primary water content	2.0	2.0	l
Electrical supply	230/50	230/50	V~/Hz
External fuse	3	3	A
Power input	150	150	W
Case height	800	800	mm
Case width	440	440	mm
Case depth	338	338	mm

3.2 Boiler connections

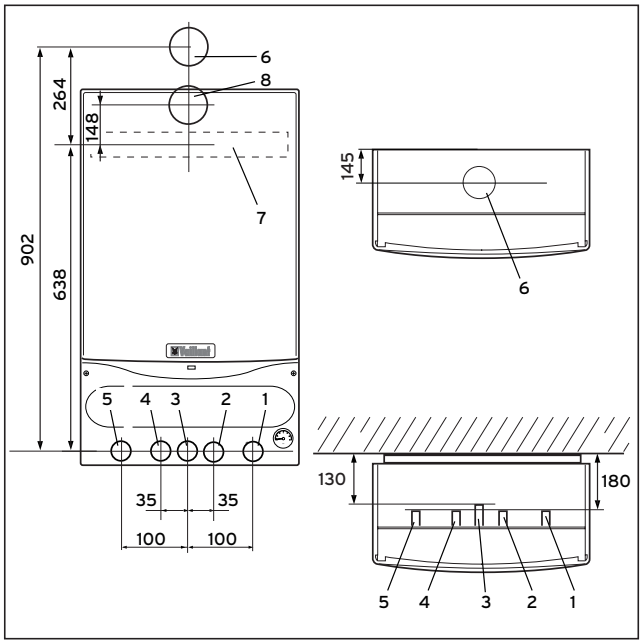

Fig. 3.1: Connection diameters turboMAX pro

Key:

1 Heating system return (22 mm tail)
2 Cold water connection with shut off valve (15 mm tail)
3 Gas connection (15 mm tail)
4 Hot water connection (15 mm tail)
5 Heating system flow (22 mm tail)
6 Flue outlet (100 mm flue with turret)
7 Hanging bracket
8 Rear flue outlet

3.3 Functional Diagram

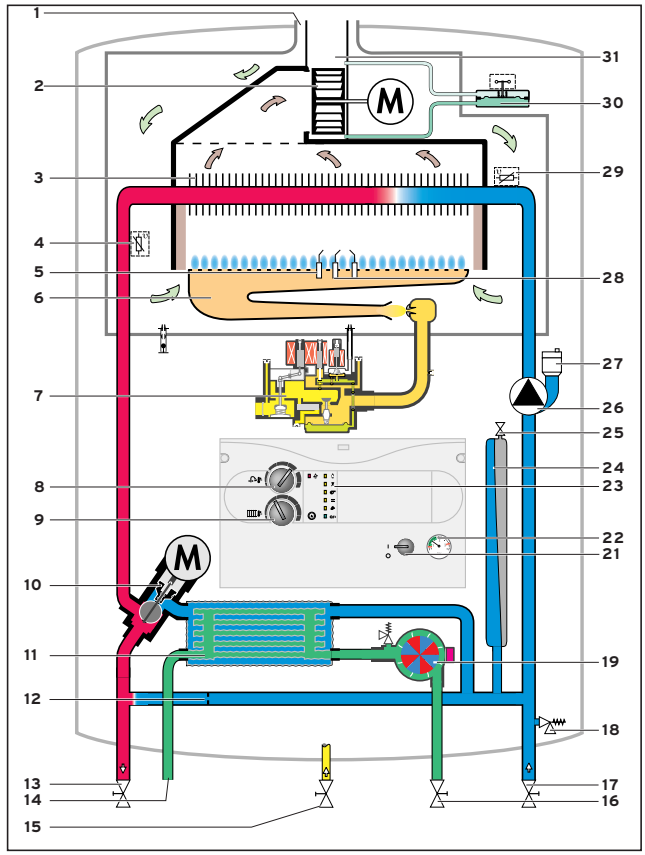

Fig. 3.2: Functional Diagram

1 Air duct
2 Fan
3 Main heat exchanger
4 Temperature sensor (NTC I)
5 Flame sensing electrodes
6 Modulating burner
7 Fully modulating automatic gas value
8 Maximum hot water temperature control
9 Maximum radiator temperature control
10 Diverter valve
11 DHW heat exchanger
12 Automatic bypass valve
13 CH flow service valve
14 Hot water outlet
15 Gas service valve
16 Cold water service valve
17 CH return service valve
18 Pressure relief valve
19 Aqua sensor (DHW flow switch)
21 Main on/off control
22 Pressure gauge
23 Indicator lights
24 Expansion vessel
25 Expansion vessel charging valve
26 Circulating pump
27 Automatic air vent
28 Ignition electrode
29 Temperature sensor (NTC II)
30 Air pressure switch
31 Flue gas duct

4 General Requirements

4.1 Related Documents

The installation of the boiler must be in accordance with the relevant requirements of Gas Safety (Installation and Use) Regulations 1998, Health and Safety Document No. 635 (The Electricity at Work Regulations 1989), BS7671 (IEE Wiring Regulations) and the Water Supply (WaterFittings) Regulations. It should also be in accordance with the relevant requirements of the Local Authority, Building Regulations, Building Standards (Scotland) Regulations and the relevant recommendations of the following British Standard; Including current amendments to Approved Documents Part L and J.:

BS 5440: Flues and ventilation of gas fired boilers not exceeding 70 kW net:
- Part 1: Flues
- Part 2: Ventilation

BS 5449: Specification for forced circulation hot water for domestic premises.
BS 5546: Specification for gas hot water supplies for domestic premises.
BS 6700: Services supplying water for domestic use within buildings and their curtilages.
BS 6798: Specification for installation of gas fired boilers not exceeding 70 kW input net.
BS 6891: Specification for installation of low pressure gas pipework up to 28 mm (R1) in domestic premises (2nd family gas).
BS 7593: Treatment of water in domestic hot water central heating systems.Institute of Gas Engineers Publication IGE/UP/7/1998: Guide for Installation in Timber Framed Housing. Benchmark Code of Practice. Building Regulations Approved Documents Part L 2002 Part J 2002.

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Important!
The appliance must be installed and serviced by a competent person as stated in the Gas Safety (Installation and Use) Regulations 1998.

Preliminary remarks

This appliance should only be installed in conjunction with a Vaillant flue system.
Install the flue system as detailed in the separate flue installation instructions supplied with this boiler.

4.2 Boiler location

The location chosen for the boiler must permit the provision of a satisfactory flue termination. The location must also provide adequate space for servicing and air circulation around the boiler. The boiler may be installed in any room, although particular attention is drawn to the requirements of BS7671 (IEE Regulations) and, in Scotland, the electrical provisions of the Building Standards (Scotland) Regulations, in respect of the installation of a boiler in a room containing a bath or shower.

Note!
Where a room sealed boiler is installed in a room containing a bath or shower, any electrical switch or boiler control utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower.

Where the installation of the boiler will be in an unusual location, special procedures may be necessary and BS 5546 and BS 6798 give detailed guidance on this aspect. The boiler must be mounted on a flat, vertical wall, which must be sufficiently robust to take the weight of the boiler. The boiler may be installed on a combustible wall, subject to the requirements of the Local Authorities and Building Regulations.
A compartment used to enclose the boiler must be designed and constructed specifically for this purpose. (An existing cupboard or compartment may be used provided that it is modified for the purpose). Details of essential features of cupboard/compartment design including airing cupboard installations are given in BS 6798.
If the boiler is to be fitted in a timber framed building, it should be fitted in accordance with Institute of Gas Engineers Publication IGE/UP/7/1998 „Guide for Gas Installation in Timber Framed Housing".

4.3 Gas Supply

The gas supplier should ensure the availability of an adequate supply of gas.
A gas meter may only be connected to the service pipe by the supplier of gas or their contractor.
An existing meter should be checked to ensure that it is capable of passing the rate of gas supply required.
Installation pipes should be fitted in accordance with BS 6891.
Pipework from the meter to the boiler must be of an adequate size. Do not use pipes of a smaller size than the boiler gas connection (15 mm).
The complete installation must be tested for soundness and purged as described in BS 6891.

4.4 Flue system

Note!
The boilers are delivered ready for installation utilising a top outlet flue assembly. For installation with a rear outlet flue assembly refer to the boiler flue outlet adaptation instructions supplied with the rear flue accessory.

4.4.1 Top outlet flue system (100 mm outside diameter)

The top outlet horizontal flue system (Art. No. 303 807) is suitable for installations up to 720 mm measured from the centre of the boiler flue outlet to the outside face of the wall. Flue extensions are available to extend this length up to 4.5 m for 24 kW and 3.2 m for 28 kW. Both 90° bends and 45° elbows are also available to increase siting flexibility.
A vertical flue system is also available (Art. No. 303 800).Refer to flue system installation instructions for full details.

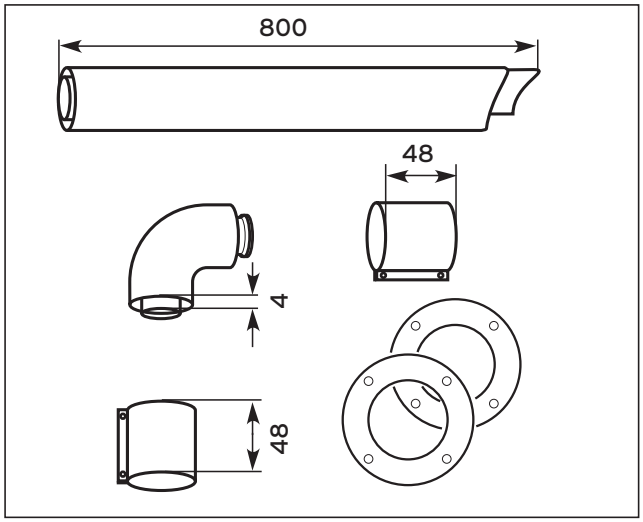


Fig. 4.1: Art.-No. 303 807

A vertical flue system is also available (Art. No. 303 800).
Refer to flue system installation instructions for full details.

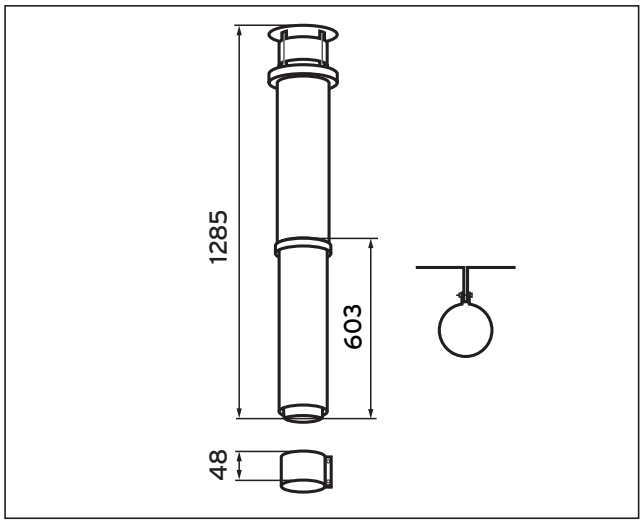


Fig. 4.2: Art.-No. 303 800

4.4.2 Rear outlet flue system (100 mm outside diameter)

The rear outlet horizontal flue system (Art. No. 303 817) is suitable for installations up to 600 mm wall thickness.

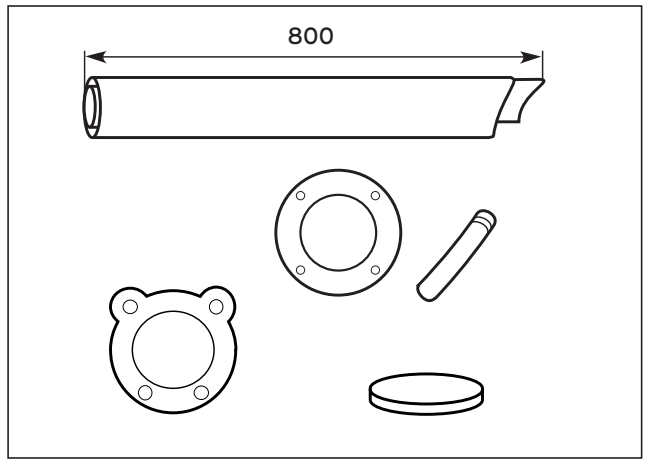


Fig. 4.3: Art.-No. 303 817

4.4.3 Extended top outlet flue system (125 mm outside diameter)

A top outlet horizontal flue system of 125 mm outside diameter is also available (Art. No. 303 609) and can be used to achieve flue lengths of up to 12.9 m for 24 kW; 10 m for 28 kW.
Both 45° and 90° bends and elbows are also available to increase siting flexibility.
A vertical 125 mm concentric flue system is also available (Art. No. 303 600).
Refer to flue system installation instructions for full details.

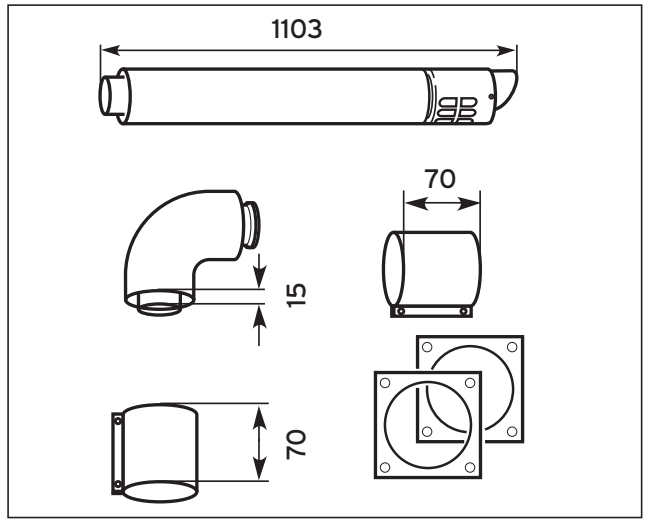


Fig. 4.4: Art.-No. 303 609

4.4.4 Flue termination

The following details refer to both flue systems.

a. The terminal must be positioned such that the products of combustion can disperse freely at all times.
b. In certain weather conditions a plume of water vapour may be visible from the flue terminal. Positions where this could be a nuisance should be avoided.
c. If the terminal is fitted less than 2 m above a balcony, above ground or above a flat roof to which people have access then a suitable terminal guard; 280 mm x 280 mm x 270 mm deep, must be provided and fitted (made by Tower Flue Components, Tonbridge, TN9 1TB).

Note!
Vertical flues must not terminate within 600 mm of an openable window, air vent or any other ventilation opening.

The flue assembly shall be so placed or shielded as to prevent ignition or damage to any part of the building.

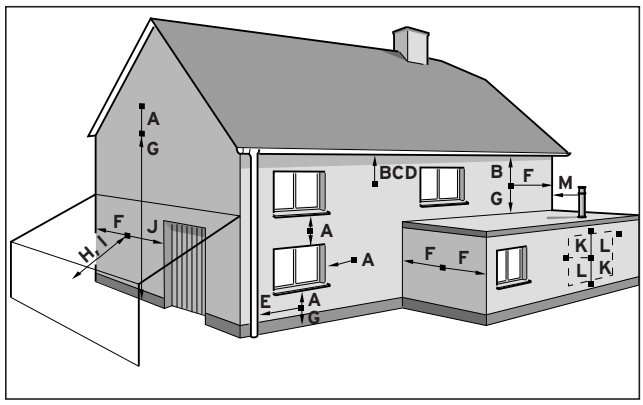


Fig. 4.5: Flue termination

	Terminal position for fan-assisted flue (minimum distance)	mm
A[1)]	Directly below an openable, above an opening or horizontal to an opening i.e. air brick, opening window or other, etc	300
B	Below gutters, soil pipes or drain pipes	25
C	Below eaves	25
D	Below balconies (below car port roof)	25
E	From vertical drain pipes and soil pipes	25
F	From internal or external corners	25
G	Above ground or balcony level	300
H	From a surface or boundary facing a terminal	600*
H	From a terminal facing a terminal	1200
J	From an opening in a car port (e.g. door, window) into a dweling	1200
K	Vertically from a terminal on the same wall	1500
L	Horizontally from a terminal on the same wall	300
M	Distance from adjacent wall for vertical Flue	500

1) In addition, the terminal should not be nearer than 150mm to an opening in the building fabric formed for the purpose of accommodating a built-in element such as a window.
* BS 5440-1 It is recommended that a fanned flue terminal should be positioned as follows: a) at least 2m from an opening in a building directly opposite, and b) so that the products of combustion are not directly directed to discharge across a boundary.

4.5 Air supply

Detailed recommendations for air supply are given in BS 5440: Part 2. It is not necessary to have an air vent in the room or internal space in which the boiler is installed.

4.6 Cupboard or compartment ventilation

The boilers are very high efficiency appliances. As a consequence the heat loss from the appliance casing during operation is very low. For cupboard or compartment installations it is therefore not necessary to provide any high or low level permanent air vents for cooling purposes.

4.7 Electrical supply

A 230 V, ~ 50 Hz single phase electricity supply fused to 3 Amp. must be provided in accordance with the latest edition of BS7671 (IEE Wiring Regulations) and any other local regulations that may apply.
The method of connection to the mains electricity supply must provide a means of completely isolating the boiler and its ancillary controls. Isolation is preferably by the use of a fused three pin plug and unswitched shuttered socket outlet, both complying with the requirements of BS 1363. Alternatively, a 3 Amp. fused doublepole switch with a 3 mm contact separation on both poles may be used.

Important!
This appliance must be earthed.

4.8 Guide to system requirements

4.8.1 Water circulation system

Detailed recommendations for the water circulation system are given in BS 6798 and BS 5449: Part 1 (for small bore and micro bore central heating systems).

Pipework not forming part of the useful heating surface should be insulated to help prevent heat loss and possible freezing, particularly where pipes are run through roof spaces and ventilated underfloor spaces. Draining taps must be located in accessible positions which permit the draining of the whole system including the boiler and the hot water system. Draining taps should be at least 1/2 in. BSP nominal size and be in accordance with BS 2879.
The boiler is suitable for use with minibore or microbore systems. Copper tubing to BS 2871: Part 1 should be used for water carrying pipework. All capillary joints in all DHW pipework must be made with lead free solder. Particularly where a new boiler is to be fitted to an existing system, it is good practice that the system is thoroughly cleansed.

Important:
To prevent the formation of deposits and prevent serious damage to the appliance and system , cleansers must be used carefully and must be completely removed by thoroughly flushing the system. Cleansers should only be left in systems for a maximum of 24 hours.

This cleansing must take place prior to the fitting of the new boiler and be in accordance with BS 7593.
For advice on the application of system cleansers contact either Sentinel, GE Betz. Widnes, Cheshire, WA8 8UD. Tel: 0151 420 9595

4.8.2 Filling and make up

The system can be filled using the built in filling loop. The connection must be removed when filling is completed. Where local Water Authority regulation does not allow temporary connection, a sealed system filler pump with break tank must be used. The heating system will not be filled automatically from the domestic hot water side.
(Alternative methods of filling sealed systems are given in BS 5449).

4.8.3 Pressure relief valve

A pressure relief valve is provided with the boiler. This safety device is required on all sealed C.H. systems and is preset at 3 bar and provided with a 15 mm compression connection for a discharge pipe, which must be of no less than 15 mm in diameter. The Pressure Relief Valve must not be used for draining purposes.

4.8.4 Pressure gauge

This is factory fitted to the boiler and indicates the primary circuit pressure to facilitate filling and testing.

4.8.5 Expansion vessel

The 24 kW boiler incorporate a 6 litre expansion vessel which is suitable for a sealed heating system with a maximum water content of 60 litres. A 10 litre expansion vessel kit is available as an optional accessory.
The 28 kW boilers incorporate a 10 litre expansion vessel which is suitable for a sealed heating system with a maximum water content of 100 litres. If the nominal capacity of the built in expansion vessel is not sufficient for the heating system (for instance in case of modernization of old open systems) an additional expansion vessel can be installed external to the boiler. It should be fitted in the return pipe as close as possible to the boiler in accordance with BS 5449: Part 1. Guidance on the sizing of an additional expansion vessel is given in Table.

	Vessel Volume [L]	
Initial system pressure (bar)	**1.0**	**1.5**
Pressure relief valve setting (bar)	**3.0**	
Total water content of system ltres		
25	2.7	3.9
50	5.4	7.8
100	10.9	15.6
125	13.6	19.5
150	16.3	23.4
175	19.1	27.3
200	21.8	31.2
225	24.5	35.1
250	27.2	39.0
275	30.0	42.9
300	32.7	46.8
325	35.7	50.7
350	38.1	54.6
375	40.9	58.5
400	43.6	62.4
425	46.3	62.4
450	49.0	58.5
475	51.8	74.1
500	54.5	78.0
For system volumes other than those given above, multiply the system volume by the factor across	0.109	0.156

4.8.6 Circulating pump

The circulating pump is included in the boiler. The pump head available for the heating system is shown in fig. 4.6.

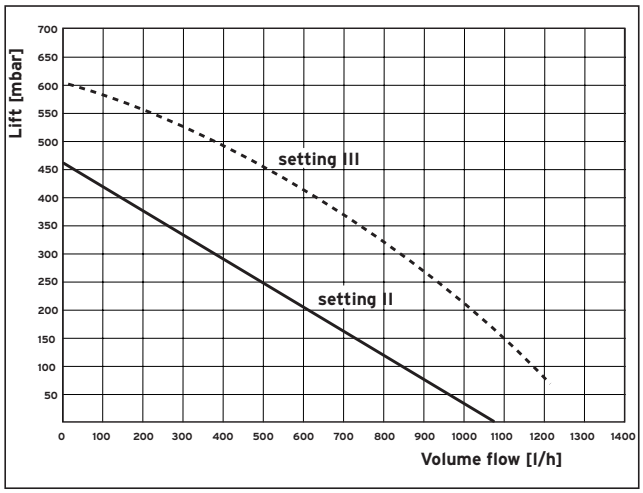


Fig. 4.6: Pump specifications

4.8.7 System by-pass

An automatic system by-pass is included within the boiler. The boiler is suitable for use in systems with thermostatic radiator valves and no additional by-pass is required.

4.8.8 Venting

The boiler is fitted with an automatic air vent. Additional provision should be made to enable the heating system to be vented during filling and commissioning either by automatic air vents or manually.

5 Boiler Installation Sequence

5.1 General
Preparation of boiler location
Clearances required
Mount the boiler on a flat and vertical area of wall of sufficient area for the boiler plus the required clearances for installation and servicing.
The clearances are as detailed below and are shown on the installation template supplied with the boiler:

- 150 mm below the boiler
- 5 mm on either side of the boiler
- 210 mm on top of the boiler
- 500 mm in front of the boiler*

* Clearance is only required to enable easier access to the boiler for servicing and may be provided by an openable door, etc.

Note!
If the boiler is to be fitted in a timber framed building, it should be fitted in accordance with Institute of Gas Engineers Publication IGE/UP/7/1998 „Guide for Gas Installations in Timber Framed Dwellings".

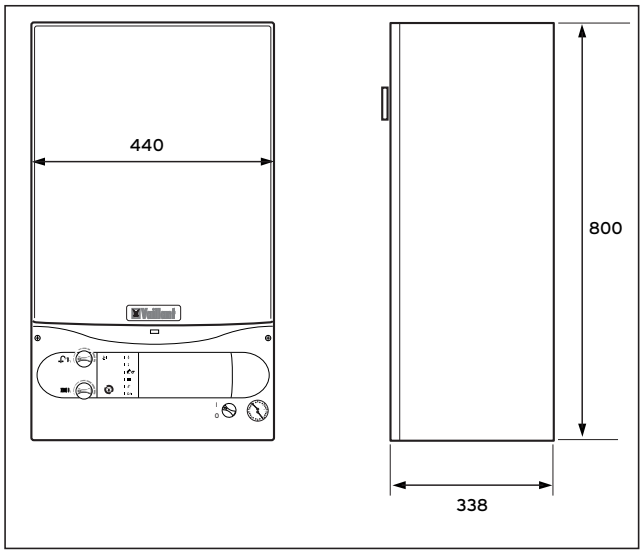


Fig. 5.1: Dimensions of boiler

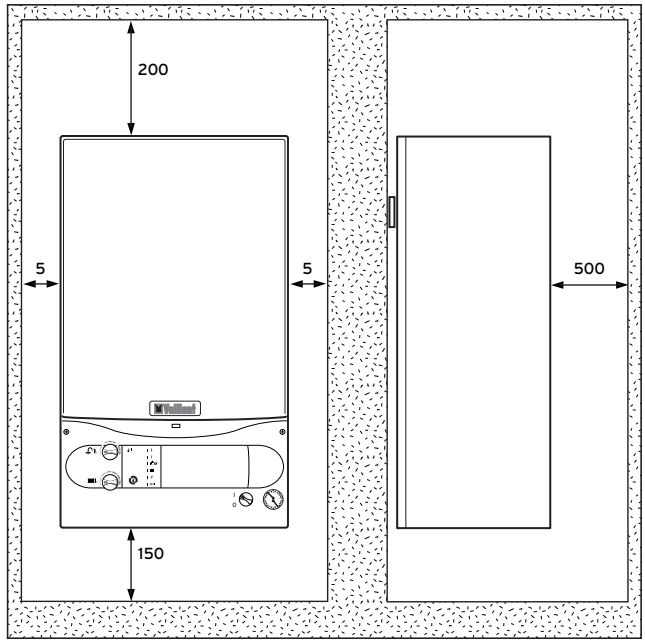


Fig. 5.2: Free space required for installation

Selecting position of boiler
Refer to „Boiler location" for information regarding siting the appliance. In general the boiler must be positioned such that.

- There is adequate space around the boiler for service and maintenance.
- The boiler can be correctly flued, i.e. the flue terminal position is sited in accordance with the flue termination section and the air/flue duct can be installed in accordance with the flue installation instructions supplied.
- All necessary pipework can be connected, including the pressure relief valve.

Note!
Should it be necessary to run system pipework to above the boiler within the width of the casing, use the optional top connection accessory (Art.No. 306 251).

5.2 Using boiler template

Fix the paper template to the wall ensuring that the correct flue exit point has been identified, ensure that the template is vertical.

The template shows

- The position of the fixing holes for the boiler mounting bracket (1).
- The position of the connections.
- The position of the flue exit hole.
- Upper hole (2) indicates top outlet flue with flue turret facing rearward.
- Lower hole (3) indicates rear outlet flue exiting directly through wall.

• Mark the position of the hanging bracket fixing holes (1).
• Drill 2 holes Ø 8 mm for the hanging bracket.

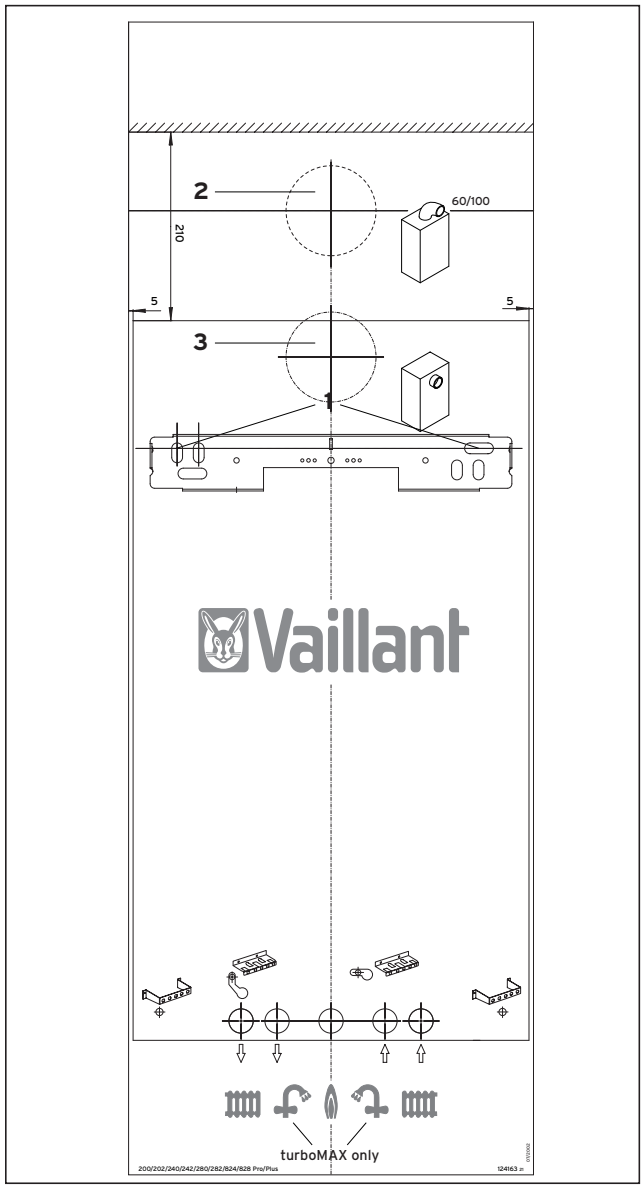


Fig. 5.3: Using Boiler template

Note!
Use alternative fixing holes where necessary.

Identify correct flue exit

Mark the centre of the selected air/flue duct and its circumference, e.g. by drilling through the template. For installation of a rear exit outlet please refer to the installation instructions of the rear exit outlet kit (Art. No. 303 817).

Other flue options

Flue instructions for other flue systems such as vertical RSF flues, flues run to the side of the boiler and the use of additional bends etc. are detailed in the flue installation instructions provided with the boiler.

Remove the template from the wall and plug the drilled holes using the wallplugs supplied.

5.3 Fitting the boiler hanging bracket

Fix the hanging bracket (2) to the wall using the screws supplied. (it may be necessary to use additional or alternative fixings to ensure adequate support).

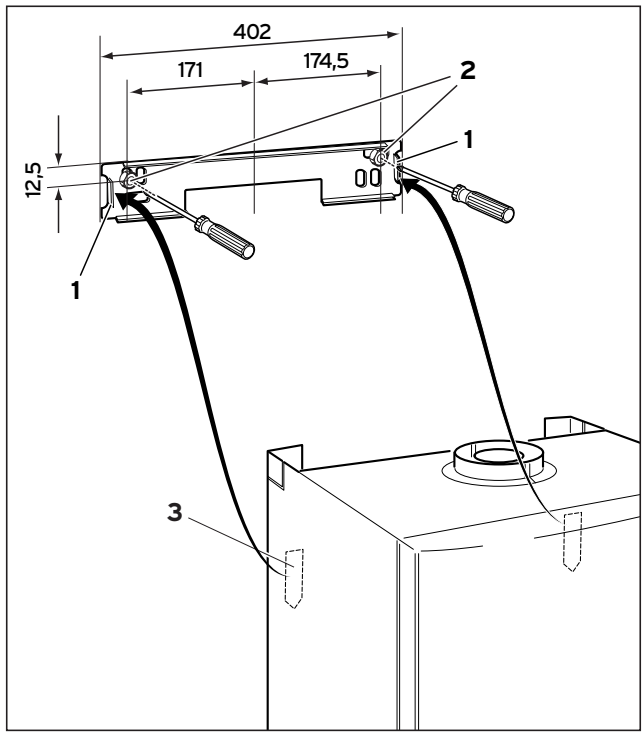


Fig. 5.4: Free space required for installation

Note!
If the boiler is to be fitted in a timber framed building ensure that the bracket is secured to a substantial part of the timber frame capable of taking the weight of the boiler.

5.4 Install the flue system
Install the flue system (refer to separate air/flue duct installation instructions).

5.5 Fitting the boiler
- Lift the boiler (3) up to the wall so that it is slightly above the hanging bracket (1).

Note!
Lift the boiler from either side at the bottom edge.

- Lower the boiler slowly onto the hanging bracket so that the cross member at the rear of the boiler fully engages onto the hanging bracket.

5.6 Removing boiler casing
- Turn both securing fasteners (1) anti-clockwise by 90° to release control panel (2).
- Pull the case (3) forward at the bottom to disengage from the securing clips.
- Lift the case slightly to clear the top locations and pull forward to remove.

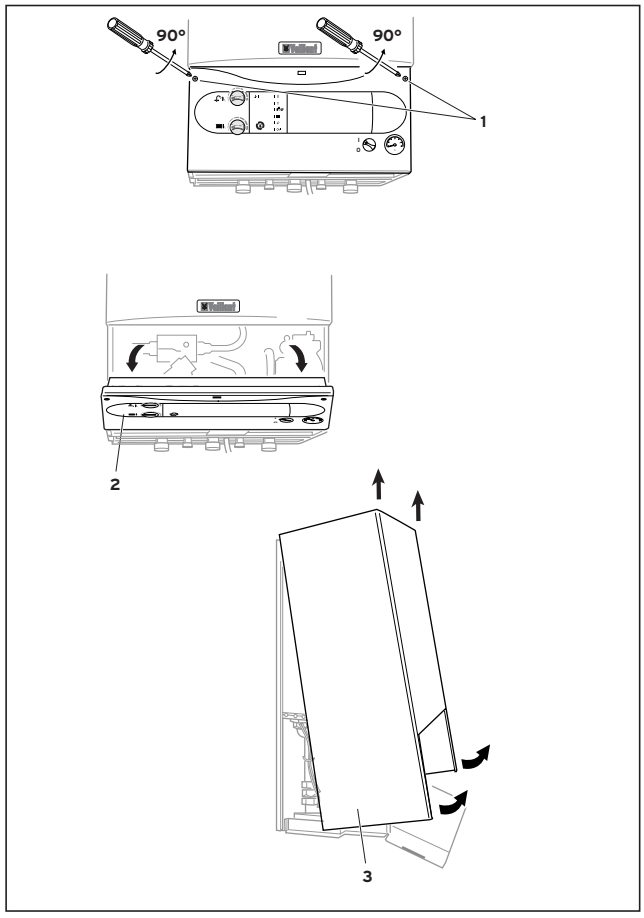


Fig. 5.5: Remove of boiler casing

5.7 Gas supply
- Connect the 15 mm compression gas service cock (1) supplied with the appliance (2) and tighten.
- Connect a gas supply pipe of not less than 15 mm diameter to the gas service cock.
- Tighten all connections.
  (Ensure the gas supply pipework is adequately sized such that a 20 mbar gas pressure is available at the boiler inlet at full flow rate).

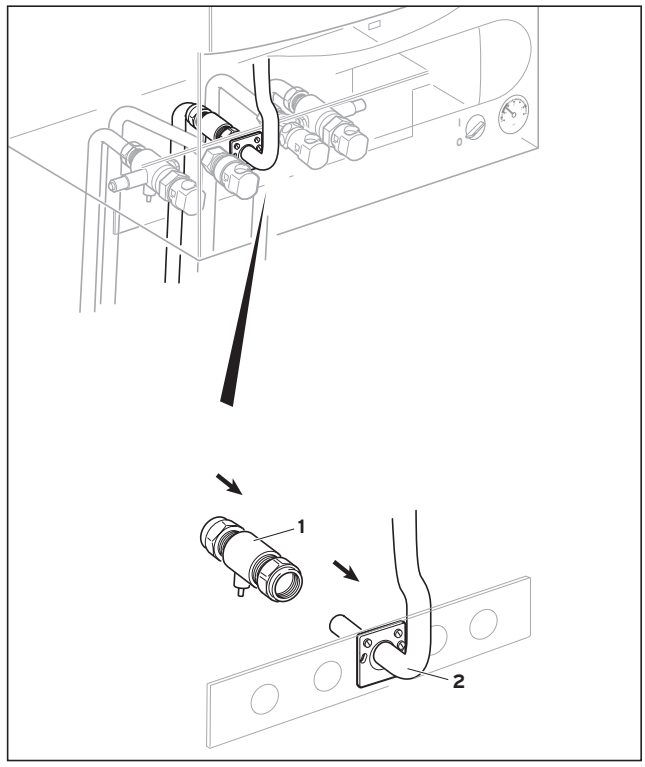


Fig. 5.6: Fitting the gas connection

5.8 Cold water mains inlet and hot water outlet

Flush all foreign matter from the mains supply before connecting to the boiler.

- Connect the cold water service valve (1) to the cold inlet water connection (3) of the appliance with the washer (2) provided and tighten.
- Connect the cold water inlet pipe copper tail to the cold water service valve and tighten.
- Connect the 15 mm hot water outlet copper tail (4) to the hot water outlet connection of the appliance (6) with the washer provided (5) and tighten.

Note!
The hot water outlet union nut is packed in with the PRV fitting pack.

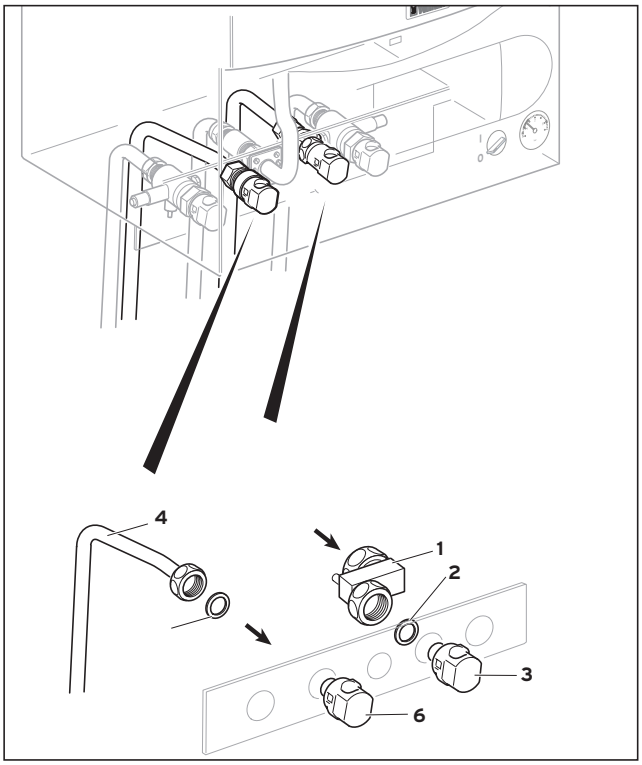


Fig. 5.7: Fitting the hot and cold water connections

5.9 Central heating flow and return pipework

Before connecting the heating circuit to the boiler appliance, all pipework and radiators must be thoroughly flushed to remove any installation debris.

- Connect the central heating flow (4) and return (1) service valves to the appliance (6 and 3) with the washers provided (2 and 5) and tighten the nuts. Ensure that the valve spindles face downwards and the drain points face to either side of the boiler.
- Connect the central heating pipework to the flow (4) and return (1) tails.

Pressure Relief Valve

Connect a discharge pipe not less than 15 mm diameter to the outlet of this valve.
The discharge pipework should be as short as possible and installed with a continuous fall away from the boiler. The pipe should terminate in a position which ensures that any discharge of water or steam from the valve cannot create a hazard to persons in or about the premises, or cause damage to any electrical components or external wiring, and the point of discharge should be clearly visible (see diagram in plastic bag).

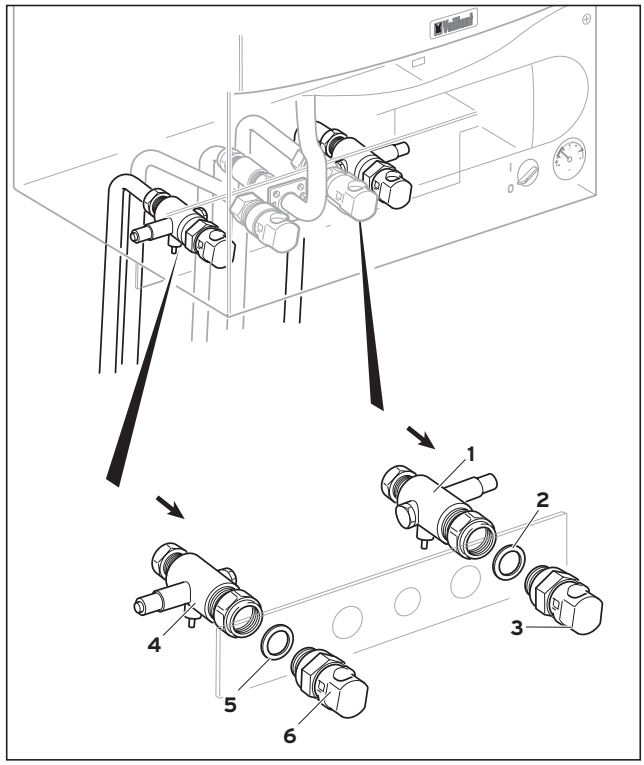


Fig. 5.8: Central heating flow and return pipework

5.10 Connect the flue system to the boiler

- Refer to separate air/flue duct installation instructions included with the boiler.

5.11 Electrical installation
General requirements

Important!
All electrical work shall be carried out by a competent person and shall comply with BS7671 (IEE Regulations).

The boiler is supplied for connection to 230 V, ~ 50 Hz supply fused at 3 A rating.
Connection to the mains supply shall be made via a fused 3 pin plug to an unswitched shuttered socket, both complying to the requirements of BS1363.
(Alternatively, connection may be made via a 3 A fused double pole isolator having a contact separation of at least 3 mm in all poles and supplying the boiler and controls only).
The point of connection to the mains supply must allow complete electrical isolation of the boiler and its ancillary controls. It should be readily accessible and adjacent to the boiler. A 3 core flexible cord according to BS6500 tables 6, 8 or 16 (3 x 0.75 to 3 x 1.5 mm2) should be used.

Warning!
This appliance must be earthed.

Important!
Ensure that all cords pass through the cable clamps in the rear of the control box and are securely fixed. Ensure that the power supply is connected such that the current carrying conductors become taut before the earth conductor should the supply cord slip from the cable clamp.

Warning!
Mains connection terminals L and N remain live even when the boiler on/off control is switched off.

5.12 Connection to the main supply

- Lower the control panel.
- Unclip the terminal box cover (1) from the control panel (2).
- Feed the power supply cord in to the appliance as shown (fig 5.9).
- Use cable clamps.

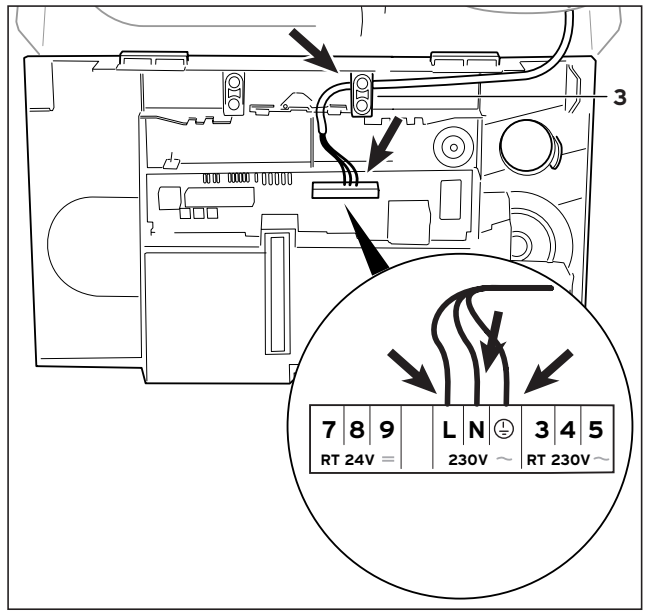


Fig. 5.9: Wiring system

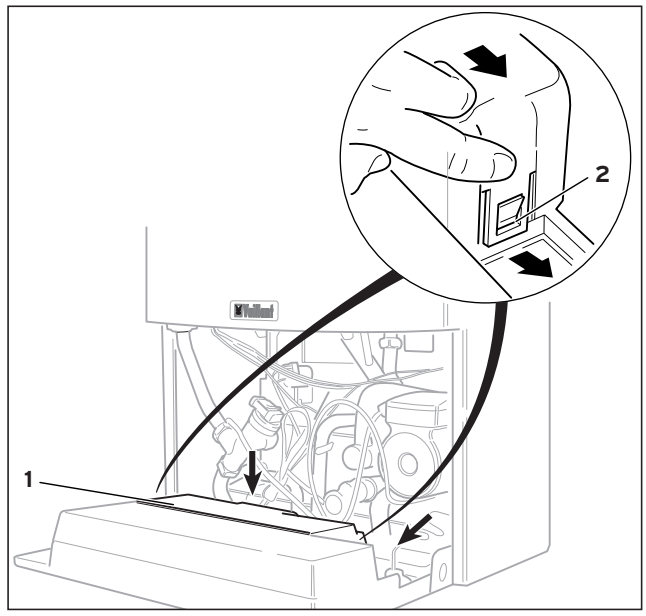


Fig. 5.10: Exposed rear view of switchgear cabinet

- Connect the power supply cord as follows (Fig. 5.11).

Green/yellow (earth) wire: boiler terminal Earth sign
Blue (neutral) wire: boiler terminal N
Brown (live) wire: boiler terminal L

Note!
DO NOT use boiler terminal connections 7-8-9.

- Refit the terminal box cover by pushing into place until it clips back into position.
- Raise the control panel and secure in place.

5.13 Electronic board layout

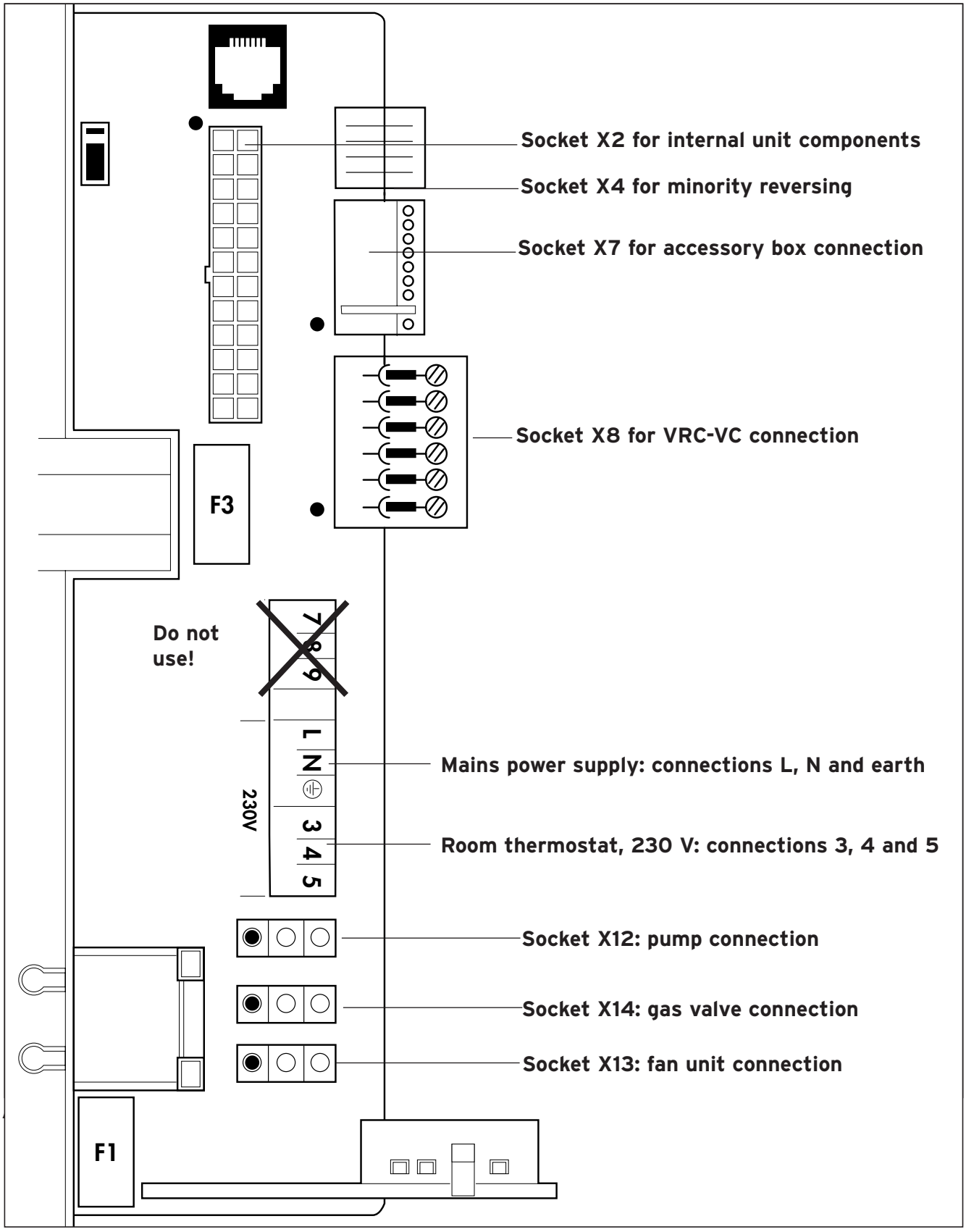


Fig. 5.11 Connection wiring

5.14 Controls

External electrical controls

The boiler terminals 3, 4 and 5 are for connecting external electrical controls such as a time switch and/or room thermostat. Terminals 3 and 4 are linked together when the boiler is supplied. If external controls are used, this link must be removed, and the controls connected across terminals 3 and 4.
Terminal 5 is an additional neutral connection for external neutrals such as from the anticipator of a room thermostat.

Connection of external controls

Connection details for programmable room thermostats.
Fig. I.12 shows the connection details where a programmable room thermostat (time switch with built in room thermostat) is used to control the boiler.

Attention!
The arrowed numbers indicate connection into the relevant terminal in the boiler terminal strip.

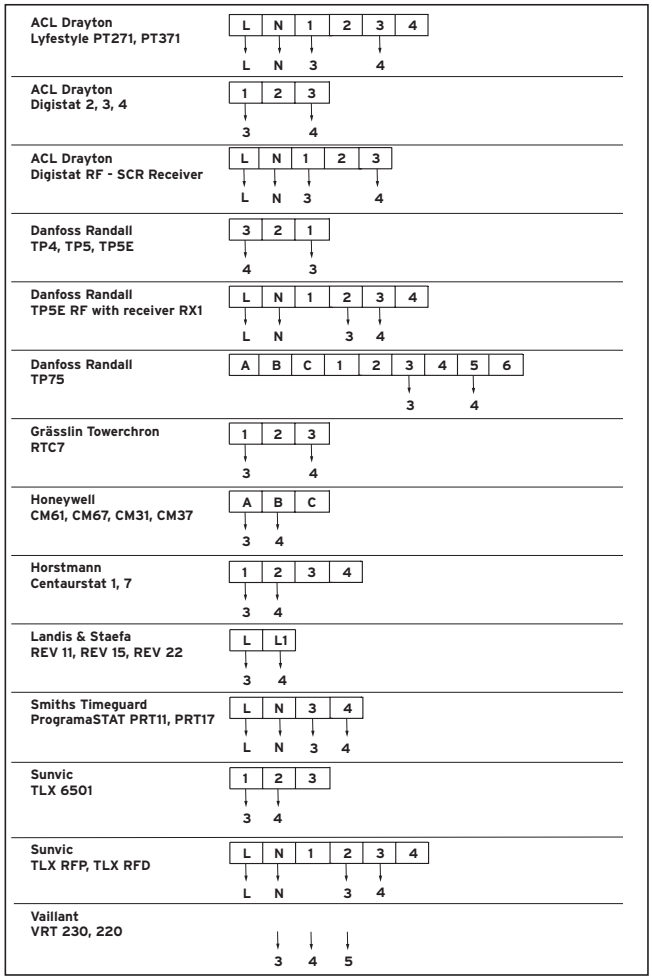


Fig. 5.12 Connection details for programmable thermostats

Connection details for external time switches and boiler terminal strip.

Fig. 5.13 shows the connection details where a time switch is used without a room thermostat to control the boiler.

Attention!
The arrowed numbers indicate connection into the relevant terminal in the boiler terminal strip.

If a room thermostat is to be connected in addition to a time switch the wire between the time switch „ON" terminal and boiler terminal 4 should be broken by the contacts of the room thermostat (see schematic layout, Fig. 5.14).

Vaillant optional plug in timer accessories

Refer to the instructions supplied with the optional accessories for connection details.
Upon completion of all electrical connections refit the terminal box cover by pushing into place. The cover is secured by two locking clips.

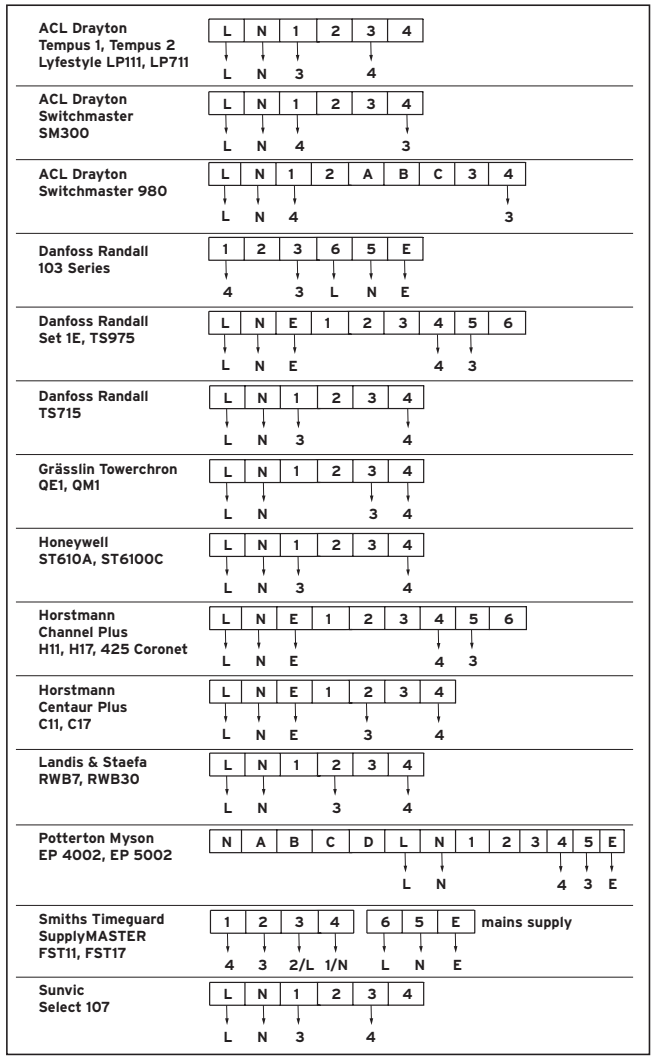


Fig. 5.13 Connection details for time switch

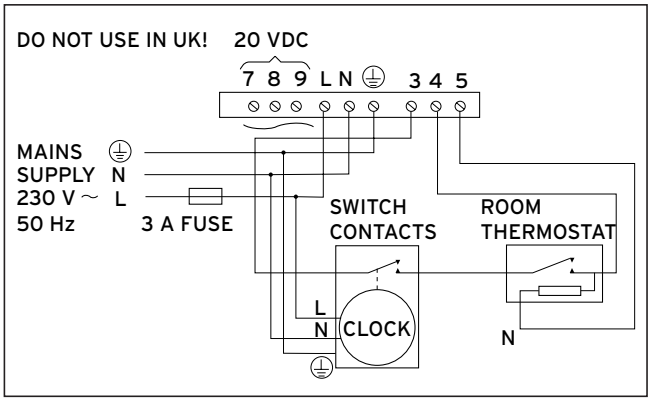


Fig. 5.14

Thermostatic radiator valves
The boiler has a built in automatic bypass valve making it ideal for use in systems with thermostatic radiator valves (no separate system bypass is required).
For optimum fuel economy it is recommended that where TRV's are used they are used in conjunction with a programmable room thermostat or separate timer and room thermostat to ensure complete boiler shut down when the heating demand is satisfied. (The radiator in the room containing the room thermostat should not be fitted with a TRV).

Frost protection
The boiler has an integral frost thermostat which is designed for protection of the boiler.To protect remote or exposed parts of the heating system or property additional frost protection measures must be taken such as the installation of an external frost thermostat. This frost thermostat should be connected across the boiler terminals 3 and 4, in parallel with any external heating controls. External frost protection cannot be used when plug in timers have been fitted.

Circulating pump
The boiler incorporates a built in circulating pump that is fully prewired (no additional wiring is necessary). The pump incorporates an automatic overrun period after the boiler switches off.

Anti-cycling 'economiser' control
The boiler incorporates a built in anti-cycling control to ensure that energy wasteful short cycling of the boiler cannot occur. This control prevents the boiler from re-igniting for a preset period of 5 minutes after central heating operation (the hot water operation is unaffected by this control and hot water can be drawn at any time).

Note!
To temporarily override the anti-cycling control turn the main boiler on/off switch to the off position „O" and then back to the on position „I" after a few seconds.

Automatic pump spin control (APS)
The boiler incorporates a built in control which will spin the built in circulating pump and operate the diverter valve (turboMAX only) once in a 24 hour period. This control helps to prevent seizure when the boiler is not operated for a period of time. This control is not active when the power supply to the appliance is turned off.

6 Commissioning Part I

6.1 Preliminary electrical checks
Check the electrical installation by carrying out short circuit, earth continuity and resistance to earth tests and a check for correct polarity.

6.2 Gas supply
The complete gas installation including the gas meter must be inspected, tested for soundness and purged in accordance with BS 6891.
The gas supply to the boiler can be purged by slackening the gas service valve beneath the boiler. Ensure that there is adequate ventilation, extinguish all naked flames and do not smoke whilst purging.
After purging, the gas service valve connection must be retightened and tested for soundness. (The boiler itself does not require purging as this will be done by the automatic burner sequence control).

6.3 Cold water supply
Open all domestic hot water taps supplied by the boiler, turn on the mains water supply to the boiler and open the mains water isolating valve below the boiler.
Water will now flow through the boiler to the hot taps. Starting with the lowest tap supplied, turn the hot taps off one at a time until the hot water pipework is purged of air. Check all hot and cold water pipework for leaks.

6.4 Filling the heating system
Proceed as follows to fill the system:
- Open all radiator valves on the system.
- Fill the system via the seperate filling point.
- Open the valve slowly and fill the unit with water until the required pressure has been acheived (2).
- Bleed the air from the radiators.
- The boiler is equipped with an automatic air release valve. To allow this to vent the boiler, the cap top must be slackened by 1 - 2 turns. (This cap must be left slackened during operation to ensure any residual air or system gases are released).
- Close the filling valve (1) and disconnect the temporary connection.
- Now check the water pressure in the unit again (and add more water if necessary).

6.5 Initial system flush (“cold“)
The whole of the heating system must be flushed out at least twice: once cold, and once hot as instructed later.
Open all radiator and heating valves and the boiler CH service valves and drain the heating system and boiler completely from the lowest points of the system via 1/2" BSP drain taps (opened full bore to remove any installation debris prior to lighting the boiler).
Refill the heating system. Check the operation of the pressure relief valve by rotating the knob on the valve.
Now check the water pressure in the unit again (and add more water if necessary).

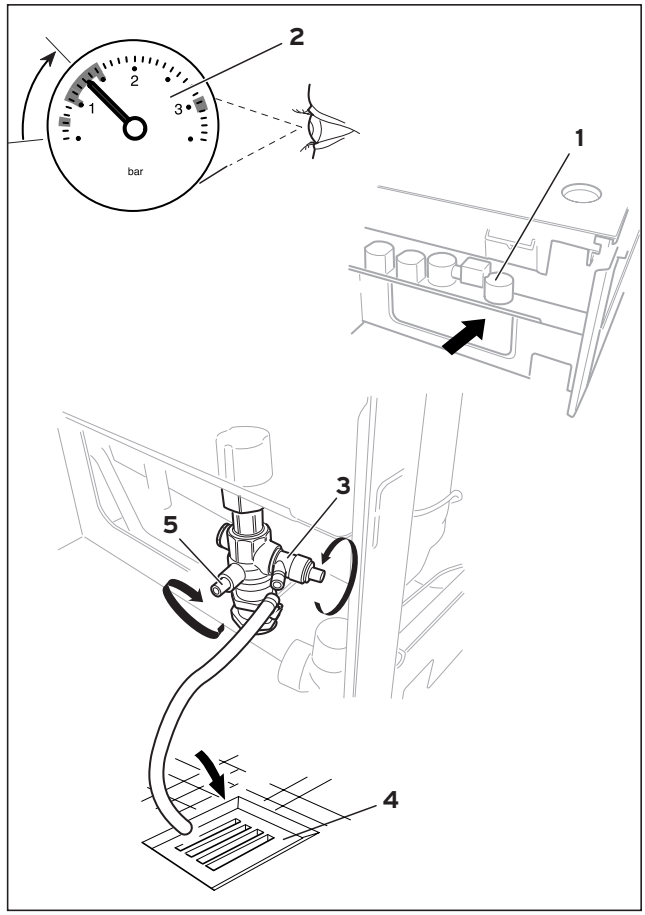


Fig. 6.1: Filling / draining the heating system

Close the filling valve (1) and disconnect the temporary connection.

7 Gas supply adjustments

7.1 Gas inlet working pressure

To check the gas inlet working pressure:

- Lower the front panel of the boiler.
- Lower the control panel.
- Slacken the sealing screw (1) located at measuring point "P.IN".
- Attach U-gauge to the inlet test point on the gas valve (2).
- Ensure that the gas service valve is open.
- Set the DHW temperature control to maximum and fire the boiler at full rate by opening a hot water tap.
- Ensure that the hot water outlet temperature adjustment control is set to maximum.
- Check that the U-gauge is reading in the range of 18 to 20 mbar. (If the pressure is not within this range this should be investigated before continuing with the commissioning preocedure.
  (Lower pressures than this range are indicative of an incorrectly sized or partially blocked gas supply.)
- Turn off the hot tap.
- Remove U-gauge, tighten test point sealing screw (1).
- Test for soundness.
- Record appliance working gas inlet pressure (mbar) in the Benchmark gas boiler commissioning checklist.

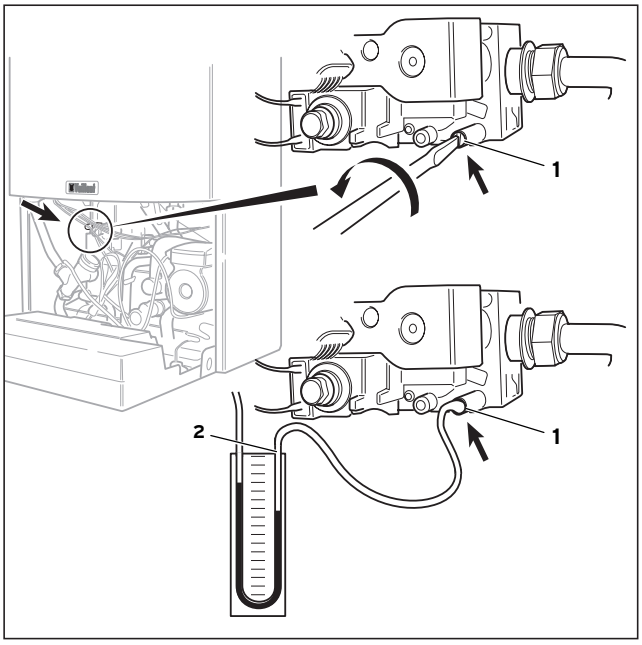


Fig. 7.1: Gas inlet working pressure

7.2 Main burner pressure

The burner pressure on this appliance has been factory set and does not require adjustment. To check the main burner pressure connect the U-Gauge as follows depending on the gas type.

- Remove front case and combustion chamber cover.

Note!
All measurements and adjustments to the gas valve must be done with the combustion chamber cover removed.

For natural gas appliances:

- Slacken the sealing screw (1) at test point on the gas valve and attach one arm of a U-gauge (2) to the test point.

For LPG appliances:

- Slacken the sealing screw (1a) at test point on the burner inlet gas pipe and attach one arm of a U-gauge (2a) to the test point.

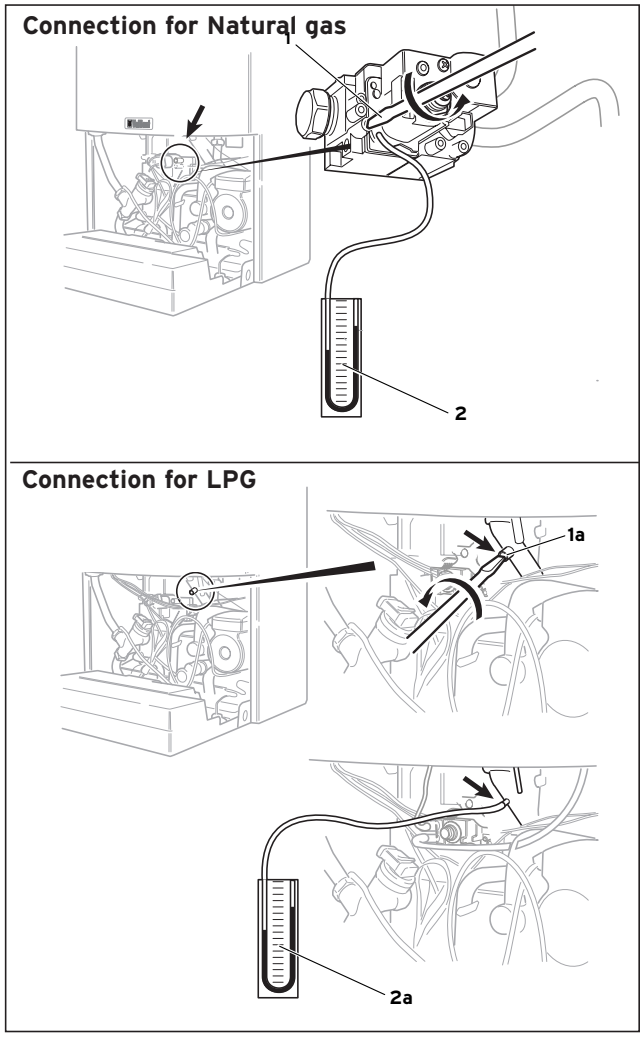


Fig. 7.2

Set the DHW temperature control to maximum and fire the boiler at full rate by fully opening a hot water tap. Check that the burner pressure is as the maximum shown in table 7.1.
Measure the domestic hot water mode burner operating pressure (mbar), the heat input (kW), the inlet and outlet domestic hot water temperatures (°C) and flow rate (l/min) and record details in the boiler logbook.
After completion of all tests tighten sealing screw, replace the sealing plug and check all test points for soundness (1/1a).

7.3 Adjusting the central heating output (range rating)

The boilers are fully modulating for central heating, and it is therefore not necessary to range rate the boiler. However, if desired, it is possible to range rate the boiler, as follows:

- Connect the U-gauge to check burner pressure.
- Use Table 7.1 on to determine the central heating output required.
- Identify required range rating setting and note main burner pressure in mbar for that output.
- Turn on the central heating.
- Turn the central heating maximum radiator temperature control to its highest setting.
- Ensure that any thermostatic radiator valves are open and set to high.
- Wait for approx. 2 minutes until the burner pressure switches to full load.
- The central heating output can now be altered by inserting an electricans screwdriver into the potentiometer (2).
- Turn the potentiometer fully anticlockwise.
- Slowly turn the potentiometer clockwise, whilst observing the U-gauge.
- Stop turning the potentiometer when the burner pressure is at the correct setting for the output required.
- Turn off the hot tap.
- Remove U-gauge, tighten test point sealing screw (1).
- Reassemble the boiler.
- Refit plastic plug in chamber sensing tube.
- Carry out all safety checks as detailed in these instructions.
- Record central heating operating pressure in the Benchmark gas boiler commissioning checklist along with the heat input (kW) and temperature difference between flow and return.

Attention!
DO NOT open any hot water tap while carrying out this procedure (turboMAX plus only).

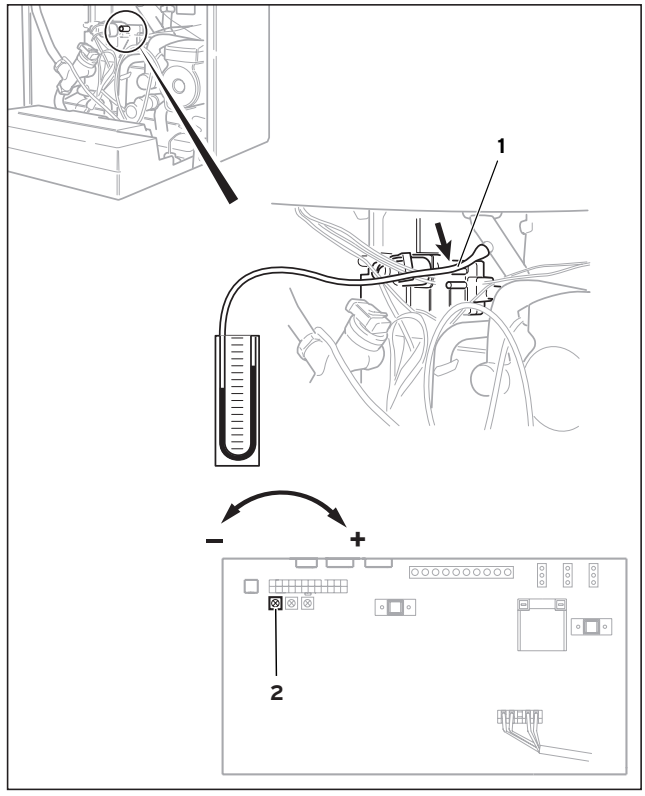


Fig. 7.3: Adjusting the central heating output

Note!
This illustration shows the U-tube pressure gauge connected to a system configured to run on natural gas. When connecting the U-tube pressure gauge to a system running on LPG, please refer to Fig. 7.2 on page 21.

7.4 Burner Pressure and gas rate

Burner Pressure turboMAX pro 24/2 E											
Delivered gas	**Output[kW]**	**Ignition rate**	**8.9**	**10.0**	**12.0**	**14.0**	**16.0**	**18.0**	**20.0**	**22.0**	**24.0**
Natural gas 2H	Burner pressure[1] [mbar]										
Main burner jet mark[2] 7 / 120	for G20	1.9	1.9	2.1	2.9	3.7	4.7	5.8	6.7	8.4	9.8
LPG 3+	Burner pressure[1] [mbar]										
Main burner jet mark[2]	for G30	3.9	3.9	4.9	6.9	9.2	11.8	14.7	17.8	21.1	24.7
7 / 072	for G31	5.4	5.4	6.7	9.4	12.5	16.0	19.8	24.0	28.5	33.3

Burner Pressure turboMAX pro 28/2 E											
Delivered gas	**Output[kW]**	**Ignition rate**	**10.4**	**12.0**	**14.0**	**16.0**	**18.0**	**20.0**	**22.0**	**24.0**	**26.0**	**28.0**
Natural gas 2H	Burner pressure[1] [mbar]											
Main burner jet mark[2] 7 / 120	for G20	1.8	1.8	2.3	3.0	3.9	4.8	5.8	6.8	8.0	9.2	10.5
LPG 3+	Burner pressure[1] [mbar]											
Main burner jet mark[2]	for G30	3.8	3.8	5.0	6.7	8.7	10.8	13.1	15.6	18.3	21.2	24.2
7 / 072	for G31	5.3	5.3	6.9	9.3	11.9	14.8	18.0	21.4	25.1	29.0	33.1

Table 7.1 Burner pressure

1) 15 °C, 1013mbar, dry
2) The nozzles are stamped with the mark shown in this table.
The marking corresponds to the nozzle hole diameter multiplied by 100

Gas Rate turboMAX pro 24/2 E									
Delivered gas	**Output[kW]**	**8.9**	**10.0**	**12.0**	**14.0**	**16.0**	**18.0**	**20.0**	**22.0**	**24.0**
Natural gas 2H	Gas Rate[1] [m³/h]									
Main burner jet mark[2] 7 / 120	for G20	1.1	1.2	1.4	1.7	1.9	2.1	2.4	2.6	2.8

Gas Rate turboMAX pro 28/2 E										
Delivered gas	**Output[kW]**	**10.4**	**12.0**	**14.0**	**16.0**	**18.0**	**20.0**	**22.0**	**24.0**	**26.0**	**28.0**
Natural gas 2H	Gas Rate[1] [m³/h]										
Main burner jet mark[2] 7 / 120	per G20	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.8	3.1	3.3

Table 7.2 Gas flow rate

1) 15 °C, 1013mbar, dry
2) The nozzles are stamped with the mark shown in this table.
The marking corresponds to the nozzle hole diameter multiplied by 100

7.5 Fit combustion chamber cover

Carefully re-fit the combustion chamber cover to the boiler ensuring it is correctly sealed. Secure cover with retaining clamps.

7.6 Fit boiler casing

- Carefully push case (1) onto the boiler such that the locating points either side at the top of the boiler engage. Push the casing onto the securing clips at the bottom of the boiler.
- Close control panel (2).
- Secure control panel by turning both securing fasteners (3) clockwise by 90°.

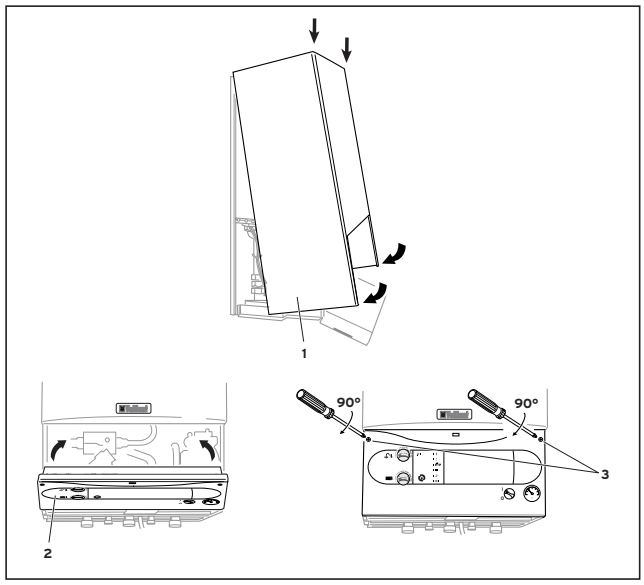


Fig. 7.4: Fit boiler casing

8 Functional Checks

8.1 Functional checks

Procedure
Once the unit has been installed and the gas supply has been checked, operate the system to ensure that it is working correctly.

- Operate the system, following the operating instructions supplied with the boiler.
- Check the system for water leaks and escaping gas.
- Check that the flue has been correctly installed, according to the fitting instructions supplied with the flue assembly.
- Check the burner for correct ignition and flame picture.
- Check the hot water system for correct operation.
- Check the heating system for correct operation.

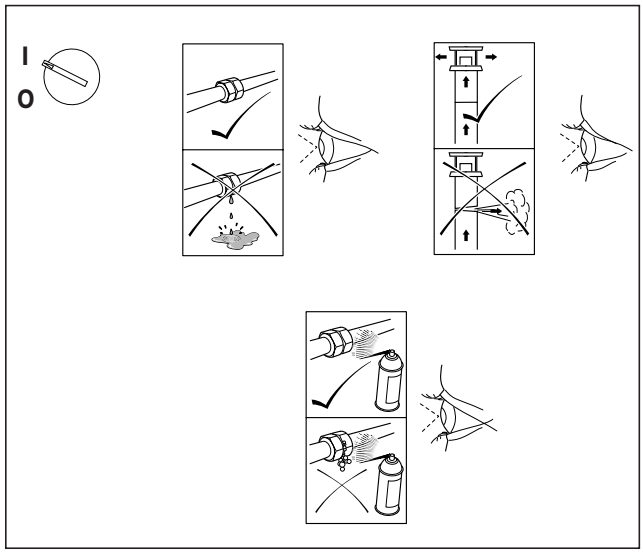


Fig. 8.1 Test for correct functioning

8.2 Functional check of operation

The Vaillant turboMAX pro is equipped with a set of diagnostic indicator lights to show the operational status of the boiler.
A functional check of DHW and CH operation can be made using these indicator lights.

Hot water system
- Ensure that the power on indicator (1) is illuminated.
- Turn on a hot top and draw water at a high rate.
- The hot water demand indicator (2) will illuminate.
- The appliance will start its lighting sequence. Once the fan and flue system has proved itself, the fan operation indicator (4) will light.
- The gas valve will open and sparking will commence at the burner. The ignition indicator (5) will illuminate.
- As soon as the burner has ignited and the flame has been sensed the flame indicator (6) will illuminate.
- By illuminating in this sequence the indicator lights have demonstrated correct operation of the boiler for DHW.

Note!
Should the boiler fail to light it will attempt 2 re-ignition sequences, if the boiler still fails to light the burner lock out indicator will illuminate (7). This usually means that the gas supply is turned off or has not been purged of air. Check the gas supply, push the reset button and repeat the lightning procedure.

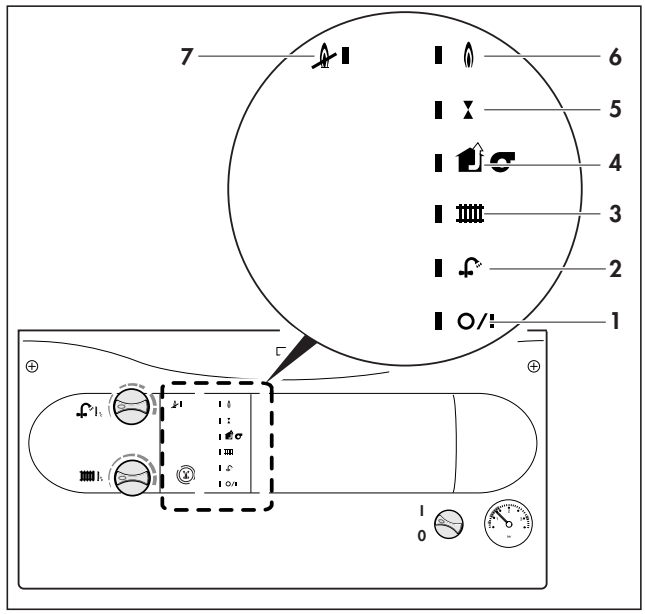


Fig. 8.2 Functional check

Heating system
- Ensure that the power on indicator is illuminated (1).
- Ensure that the maximum radiator temperature control is turned to the high position.
- Ensure external controls are calling for heat.
- The central heating demand indicator will illuminate (3).
- Providing the boiler has not achieved its set temperature, and the anti-cycling control is not activated, the boiler will start its lighting sequence. Once the fan and flue system have proved their satisfactory operation the fan operation indicator (4) will light.
- The gas valve will open and sparking will commence at the burner. The ignition indicator (5) will illuminate.
- As soon as the burner has ignited and the flame has been sensed the flame indicator (6) will illuminate.
- By illuminating in this sequence the indicator lights have demonstrated correct operation of the boiler for CH.

8.3 Adjusting pump speed

The unit is fitted with a two-speed pump. The pump is delivered with the switch (1) set to position III.

Attention!
Important note:
The boiler should only be operated at pump setting III because the heating capacity for hot water is reduced when operated at pump setting II!

It is possible, however, to change the pump setting from Level III to Level II manually when there is noise coming from the heating system.

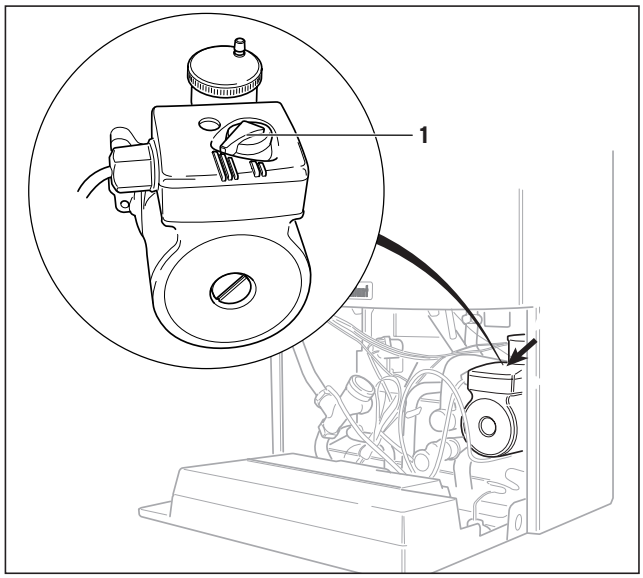


Fig. 8.3: Pump speed

Final system flush („HOT")

- Turn on the boiler for central heating and allow the boiler and system to reach operating temperature.
- Check that the heating system is watertight.
- Turn the boiler off and rapidly drain both boiler and system while still hot.
- Refill the system and release all air. Release water from the system until the system design pressure of 1.0 bar is attained.

(The actual reading on the pressure gauge should ideally be 0.5 bar plus an additional pressure corresponding to the highest point of the system above the base of the boiler - 10 m head equals an additional 1 bar reading on the pressure gauge. The minimum pressure should not be less than 1 bar in any installation.)
If the system is to be treated with an inhibitor it should be applied at this stage in accordance with the manufacturers instructions.

Further information can be obtained from Sentinel, GE Betz. Widnes, Cheshire, WA8 8UD.
Tel: 0151 420 9595

- Disconnect the temporary filling connection.
- Refit the boiler casing.
- Attach the bottom cover to the boiler by securing with the four screws provided. It may be necessary to apapt the bottom cover by removing the easy break sections.

8.4 Handing over to the user

- Set the maximum radiator temperature control to the desired setting.
- Set the maximum hot water temperature control to the desired setting.
- Instruct the user in the safe and efficient operation of the boiler, in particular the function of:

- The boiler on/off control
- The maximum radiator temperature control
- The maximum hot water temperature control
- The pressure gauge

- Show the user how to operate any external controls.
- Explain to the user the importance of having the boiler regularly serviced by a competent servicing company. To ensure regular servicing, it is strongly recommended that arrangements are made for a Maintenance Agreement. Please contact Vaillant Service Solutions (0870 6060 777) for further details.
- Ensure the Benchmark gas boiler commissioning checklist is fully completed.
  Failure to install and commission this appliance to the manufacturers instructions may invaludate the warranty (Note: This does not affect your statutory rights).
- Leave the user instructions in the clips provided in the front panel of the boiler.
- Leave the installation and servicing instructions with the user.

Note!
When you have finished the installation, attach the sticker supplied (835593) to the appliance in the user's language.

Attention!
The device may only be used
• for initial operation
• for testing
• for continuous operation
with the chamber cover closed and with the flue system fully mounted and sealed.

9 Servicing

9.1 Initial Inspection
To ensure the continued safe and efficient operation of the boiler it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage, but in general once per year should be adequate. It is the law that all servicing work is carried out by a competent person (Corgi registered).

Important!
Before starting any maintenance work:

- Isolate the mains electricity supply by disconnecting the plug at the socket outlet (if there is only an isolating switch remove the fuse from the switch).
- Turn OFF the gas supply at the gas service valve fitted to the boiler.
- Always test for gas soundness and always carry out functional checks after any service work and after exchanging any gas carrying component.
- Always check earth continuity, polarity and resistance to earth with a multimeter after any service work and after exchanging any electrical component.

Note!
The boiler is fitted with a combustion analysis test point. A suitable combustion analyser can be connected to this point to establish the combustion performance of the boiler.

Before commencing any servicing or maintenance work, carry out an initial inspection of the system as follows:
- Inspect the flue, pipework and electrical connections for indications of damage or deterioration.
- Inspect the air supply and ventilation arrangements of the installation.
- Check the heating and water system, in particular the condition of radiator valves, evidence of leakage from the heating system and dripping hot water taps.

Functional check of boiler operation
- Carry out a functional check of the boiler operation as prevoiusly detailed.
- Remove the appliance casing as detailed and operate the boiler by fully opening a hot water tap. Inspect the burner operation through the viewing window. Check that the flames are evenly covering the surface of the burner. Inspect for signs of excessive flame lift or sooting.

9.2 Cleaning the burner and primary heat exchanger

- Turn off the boiler.
- Isolate the electrical supply to the boiler.
- Remove the boiler case as described.
- Turn off the gas service valve.
- Turn off the boiler CH service valves.
- Turn off the cold water inlet service valve.
- Release the three clamps (1), remove the combustion chamber cover (2).
- Pull the three cables (4) and two tubes (5) from the fan assembly.
- Remove the fan assembly (6a, 6b, 6c).
- Remove the four screws (7) and detach the front cover panel from the combustion chamber (8).
- Check the burner (9) and heat exchanger fins (10) and remove any loose deposits with a soft brush.
- Reassemble in reverse order.
- Check central heating expansion vessel.

Note!
It is not necessary to carry out this check every year – a check every three years should be sufficient.

- Release the system water pressure from the boiler.
- Remove valve cap from expansion vessel charge point.
- Check that the internal charge pressure of expansion vessel is between 0.7 - 0.9 bar. If pressure is lower than this the vessel should be re-pressurised using an air pump.
- Refit valve cap.
- Open central heating service valves and re-pressurise the boiler and heating system if necessary.
- Open the gas service valve.
- Turn on the mains power supply.
- Operate the boiler and carry out soundness, safety and function checks.
- Complete the service interval record section in the Benchmark gas boiler commissioning checklist.

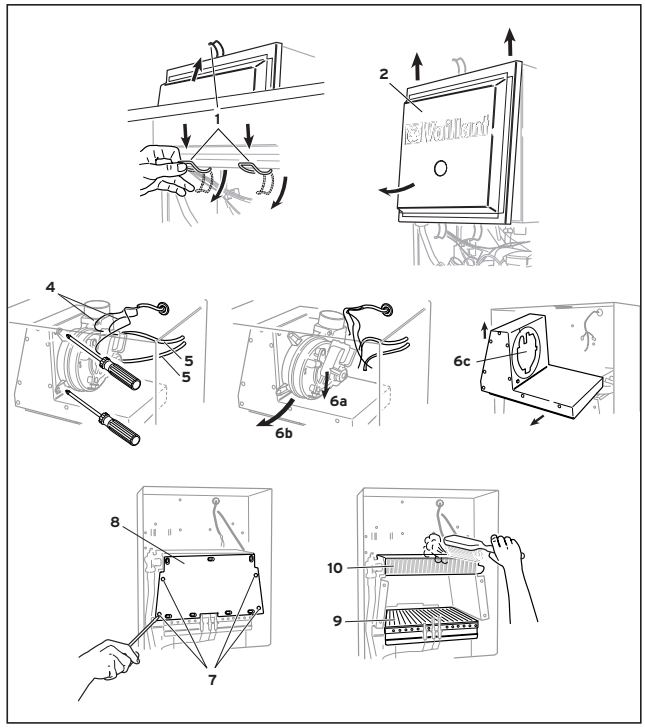


Fig. 9.1 Cleaning the burner and primary heat exchanger

10 Fault Finding

10.1 Introduction

The turboMAX pro has built in diagnostic indicator lights to assist you with fault finding in the unlikely event of a boiler malfunction. The lights will illuminate in sequence, indicating the operational status of the boiler. Should a fault develop in the boiler the indicators may flash highlighting the possible fault e.g.

Power on indicator (green)
Illuminates when the electricity supply to the boiler is on, the main on/off control is set to position (I) and the internal boiler fuses are o.k.
(A flashing indicator shows that the overheat thermostat has cut out.)

Hot water demand indicator (yellow)
Illuminates whenever there is a demand for hot water i.e. a hot water tap is opened.

Central heating demand indicator (yellow)
Illuminates whenever there is a demand for central heating i.e. the radiator temperature control is turned on and the external heating controls are calling for heat.

☞ **Note!**
If the external controls are not calling for heat (i.e. the room thermostat has reached temperature) this indicator will go out. This is perfectly normal.

Fan operation indicator (yellow)
Illuminates to indicate that the fan is operating and has been checked by the fan pressure switch.
(A flashing indicator shows that the air pressure switch has not made.)

Ignition indicator (yellow)
Illuminates when gas valve, operator and ignition transformer are energised. This indicator remains on during burner operation.
(A flashing indicator shows lack of water or poor water circulation in central heating system.)

Flame indicator (yellow)
Illuminates when flame is recognised by the flame monitoring system.
(A flashing indicator shows that an NTC sensor is broken, not connected or shorted to earth.)

Burner lockout indicator (red)
Illuminates if the burner fails to light within 10 seconds of illumination of the ignition indicator after the 3rd ignition cycle.
(A flashing indicator shows a failure in the electronic boards.)

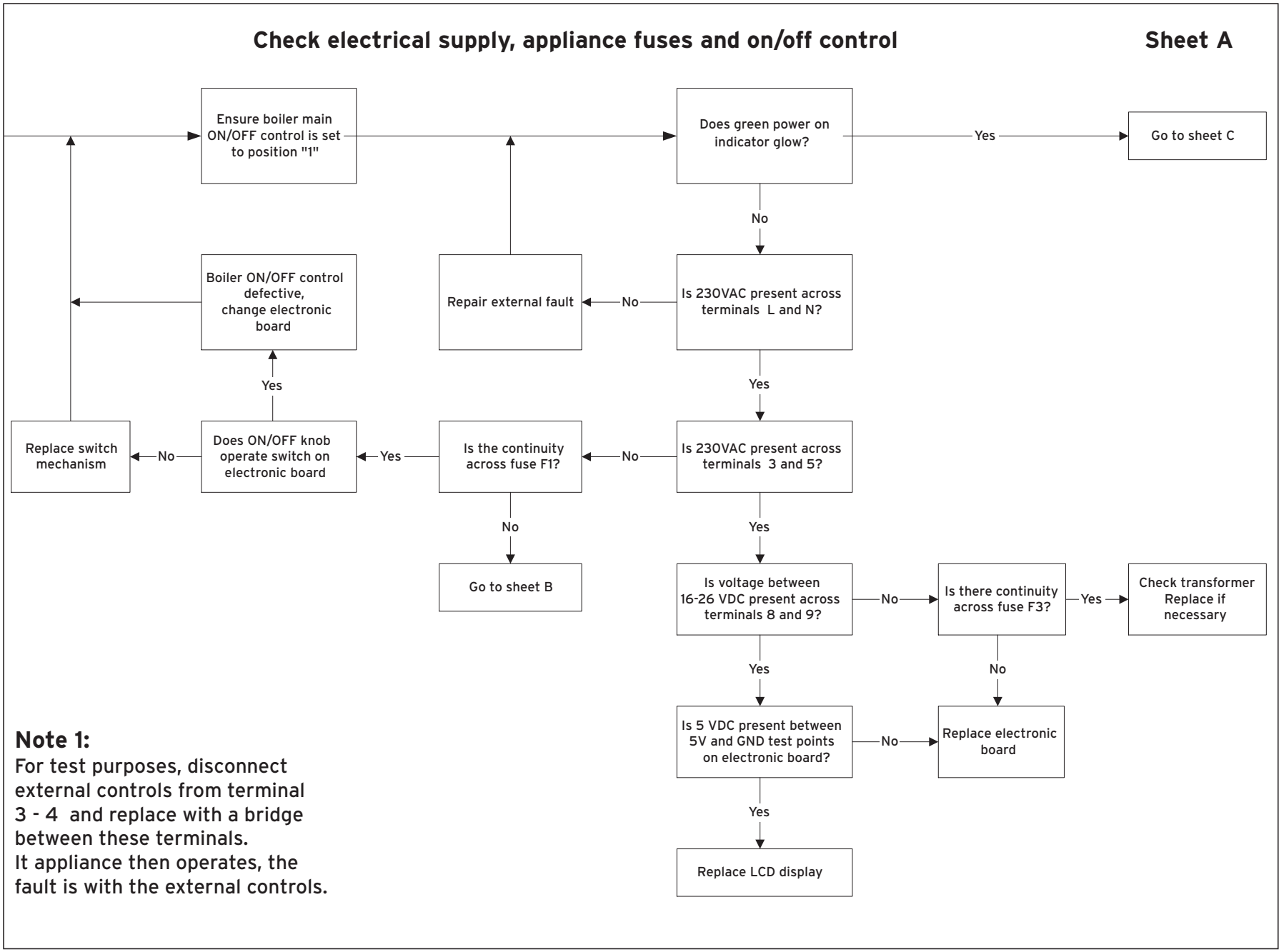
To reset the appliance after a lockout (either burner lockout illuminated or any other indicator light flashing), turn the central heating control to the reset position and release.

10.2 Logical fault finding procedure

Preliminary Checks
These checks must be carried out before attempting to use the fault finding guide:
1) Carry out electrical safety checks.
2) Check that the external electricity supply to the boiler is on, and a supply of 230 V~ is present between boiler terminals „L“ and „N“.
3) Check that gas supply to the boiler is on and that it has been correctly purged.
4) Ensure the heating system is full of water and charged to approx. 1 bar. If not refill the system and vent system. Ensure boiler flow and return service valves are open.
5) Check that boiler main on/off control is set to position (I)
6) Ensure that the Maximum Radiator Temperature and Maximum Hot Water Temperature controls are set to high position.
7) Check that all the external controls are on and calling for heat (if no external controls are fitted, boiler terminals 3 and 4 must be linked). Check that boiler anti-cycling „economiser“ control is not engaged.

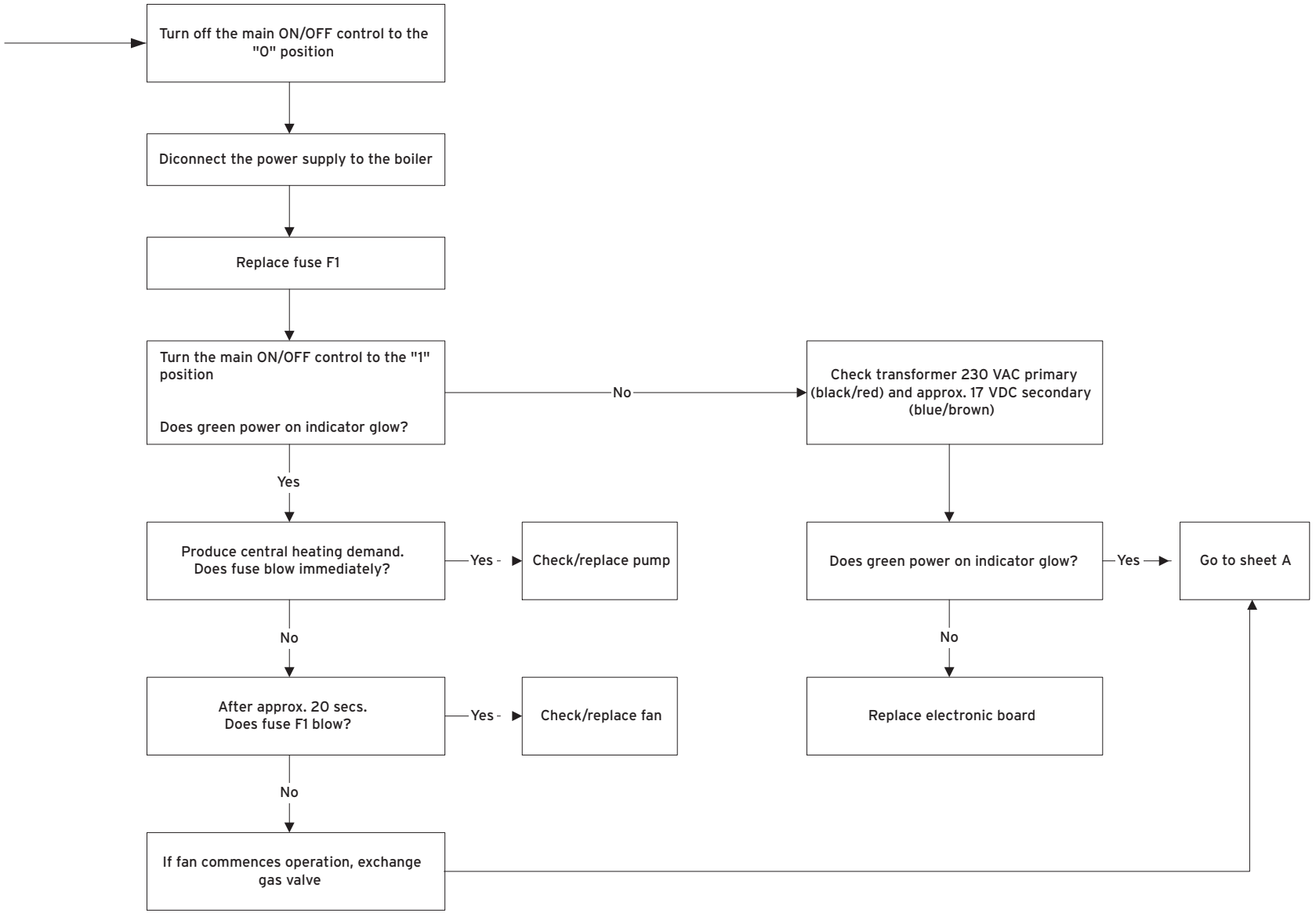
Procedure

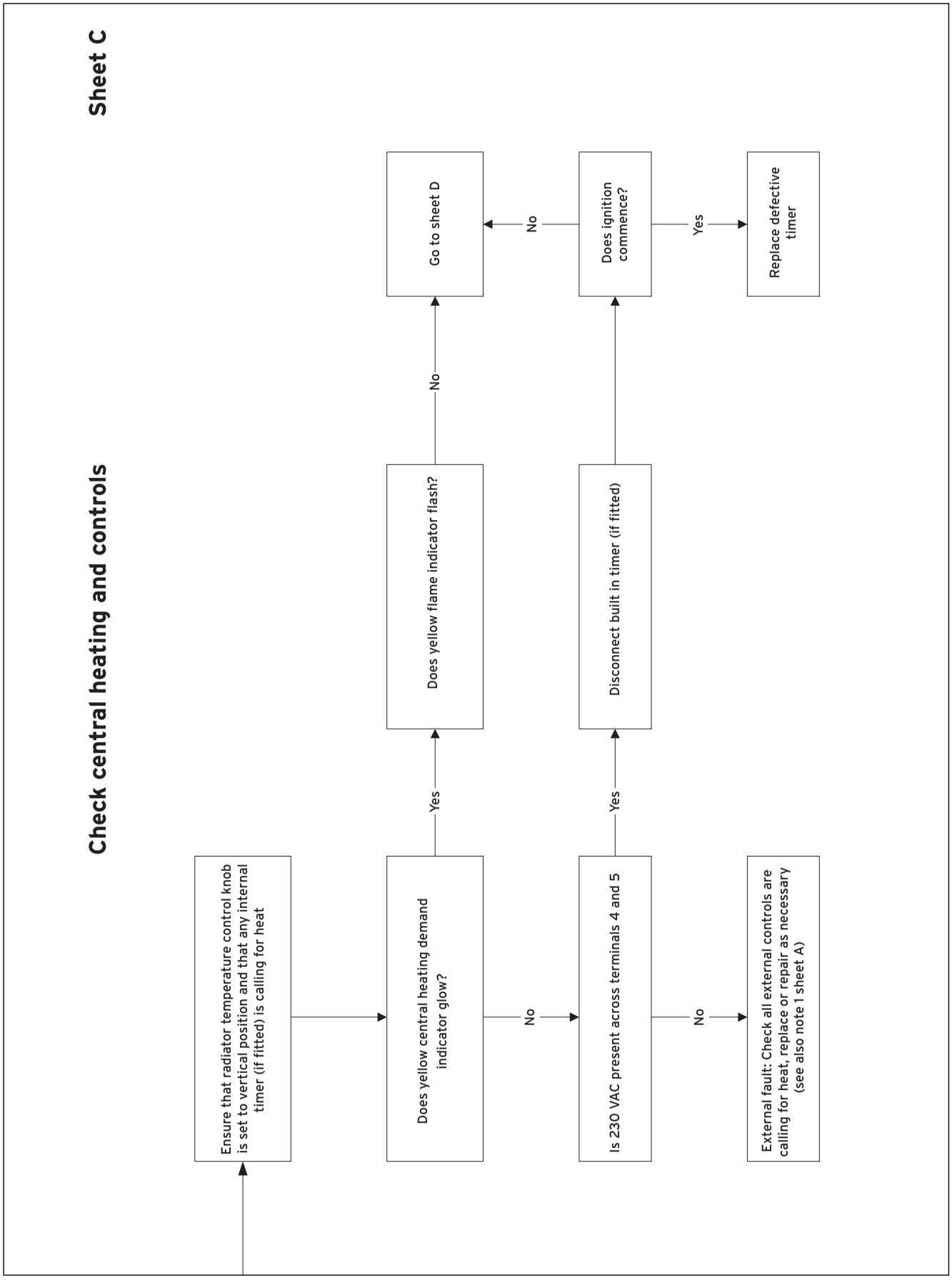
☞ **Note!**
Always check the operation of the boiler for central heating first before checking hot water operation. Do not open a hot tap unless instructed to by the fault finding guide.

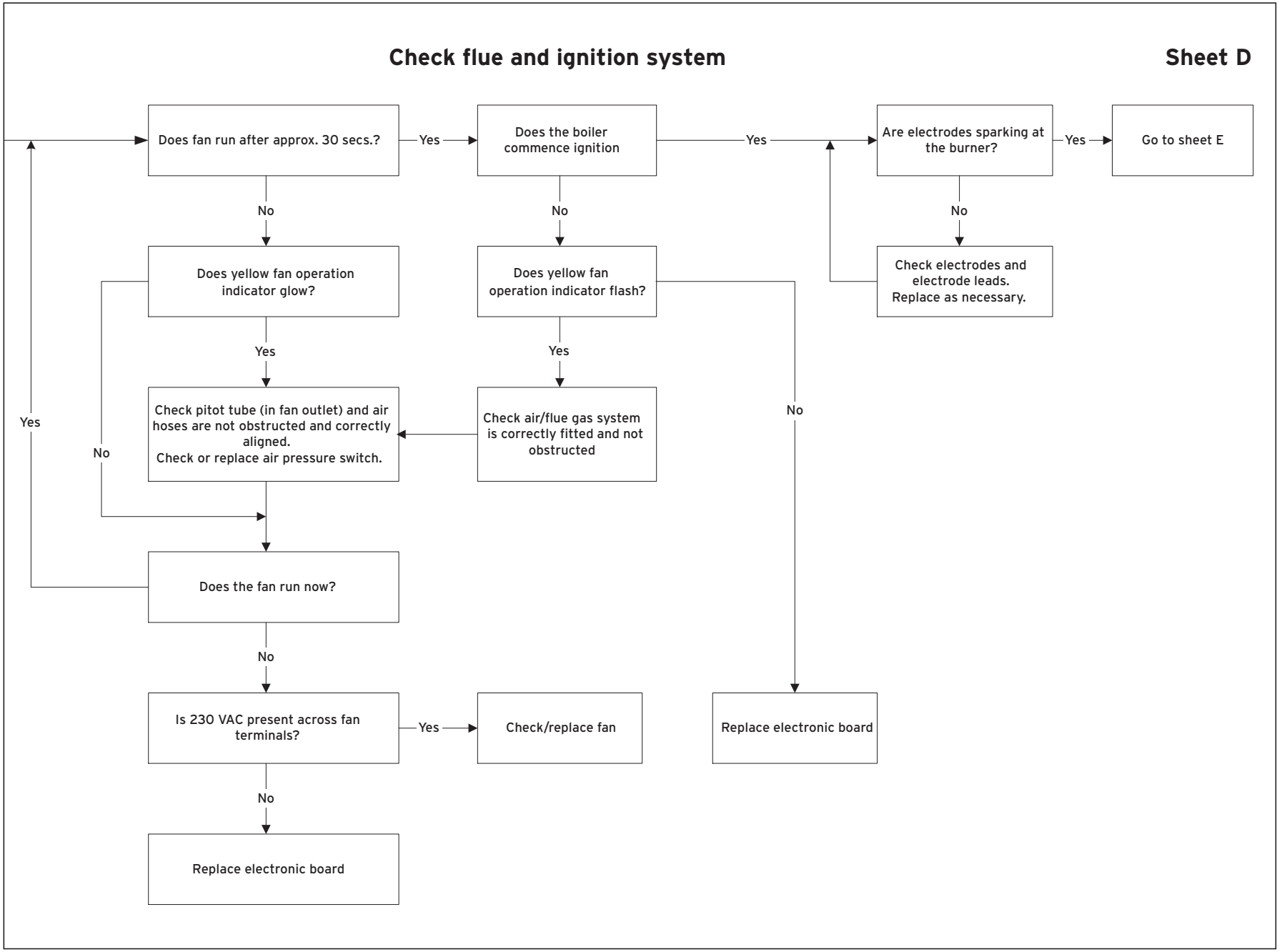

Check electrical supply, appliance fuses and on/off control
Sheet A
Ensure boiler main ON/OFF control is set to position "1"
Does green power on indicator glow?
Yes
Go to sheet C
No
Boiler ON/OFF control defective, change electronic board
Repair external fault
No
Is 230VAC present across terminals L and N?
Yes
Yes
Replace switch mechanism
No
Does ON/OFF knob operate switch on electronic board
Yes
Is the continuity across fuse F1?
No
Is 230VAC present across terminals 3 and 5?
No
Yes
Go to sheet B
Is voltage between 16-26 VDC present across terminals 8 and 9?
No
Is there continuity across fuse F3?
Yes
Check transformer Replace if necessary
Yes
No
Is 5 VDC present between 5V and GND test points on electronic board?
No
Replace electronic board
Yes
Replace LCD display
Note 1:
For test purposes, disconnect external controls from terminal 3 - 4 and replace with a bridge between these terminals.
It appliance then operates, the fault is with the external controls.

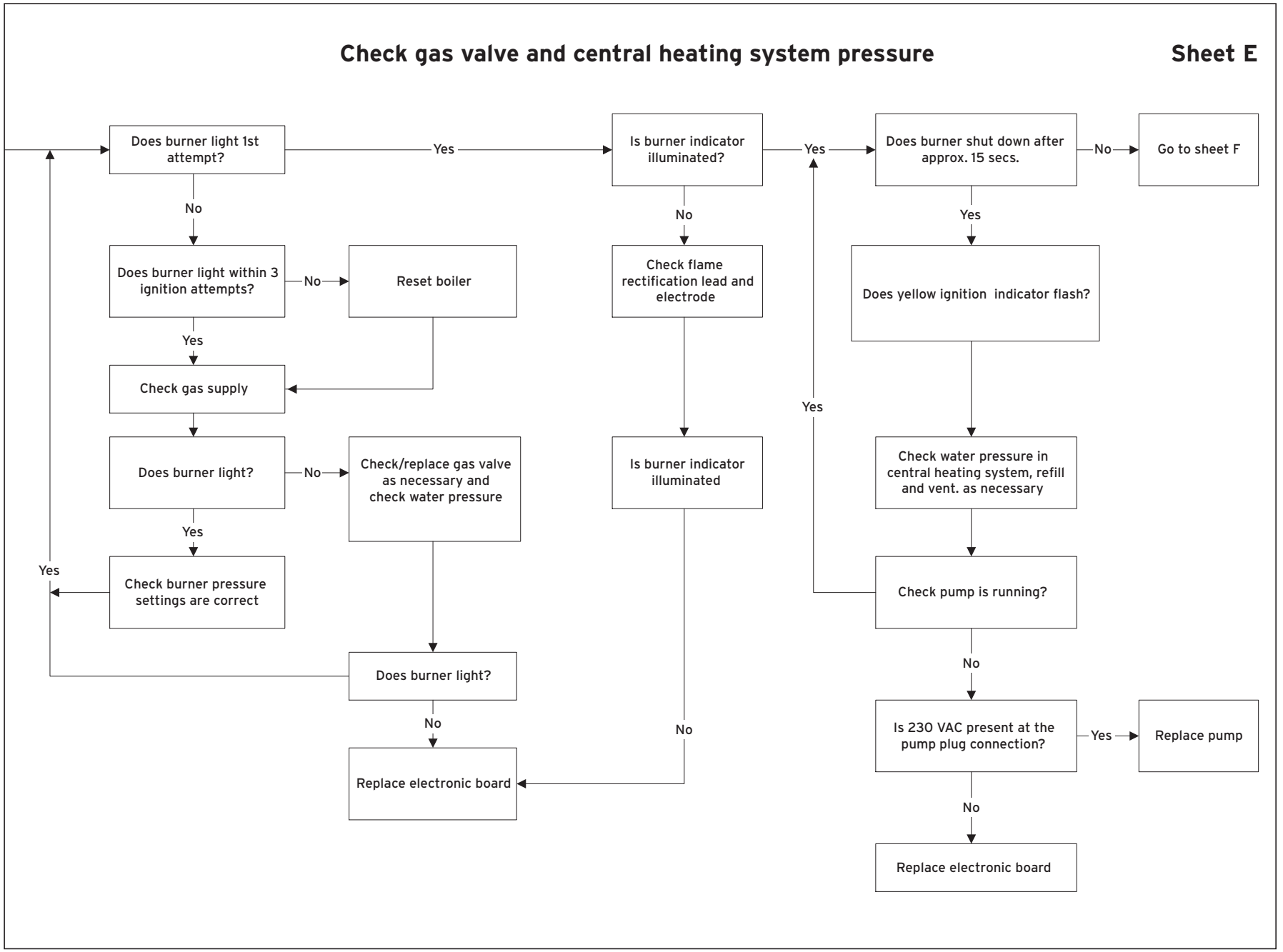
Check operation of pump and fan

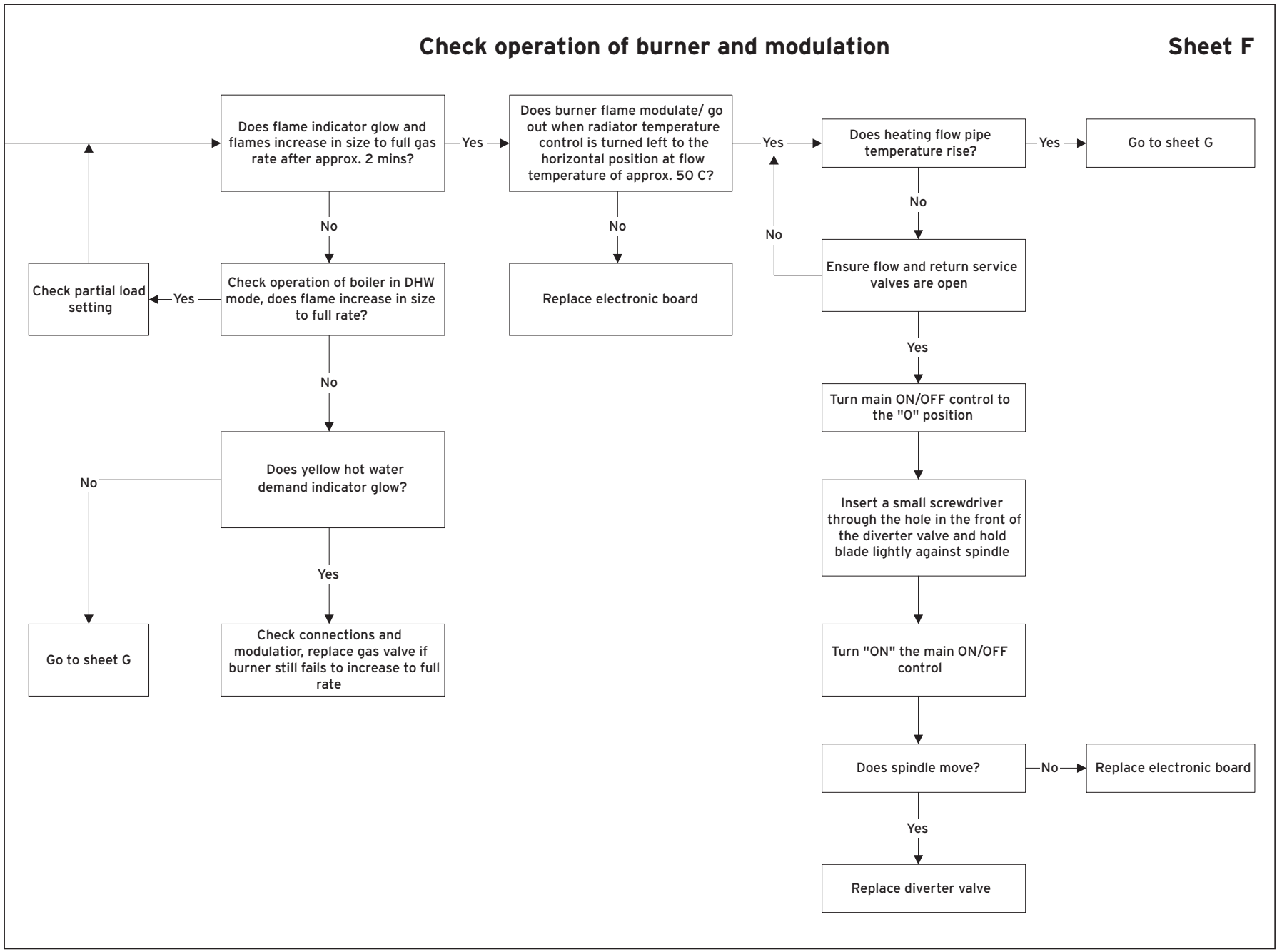
Sheet B

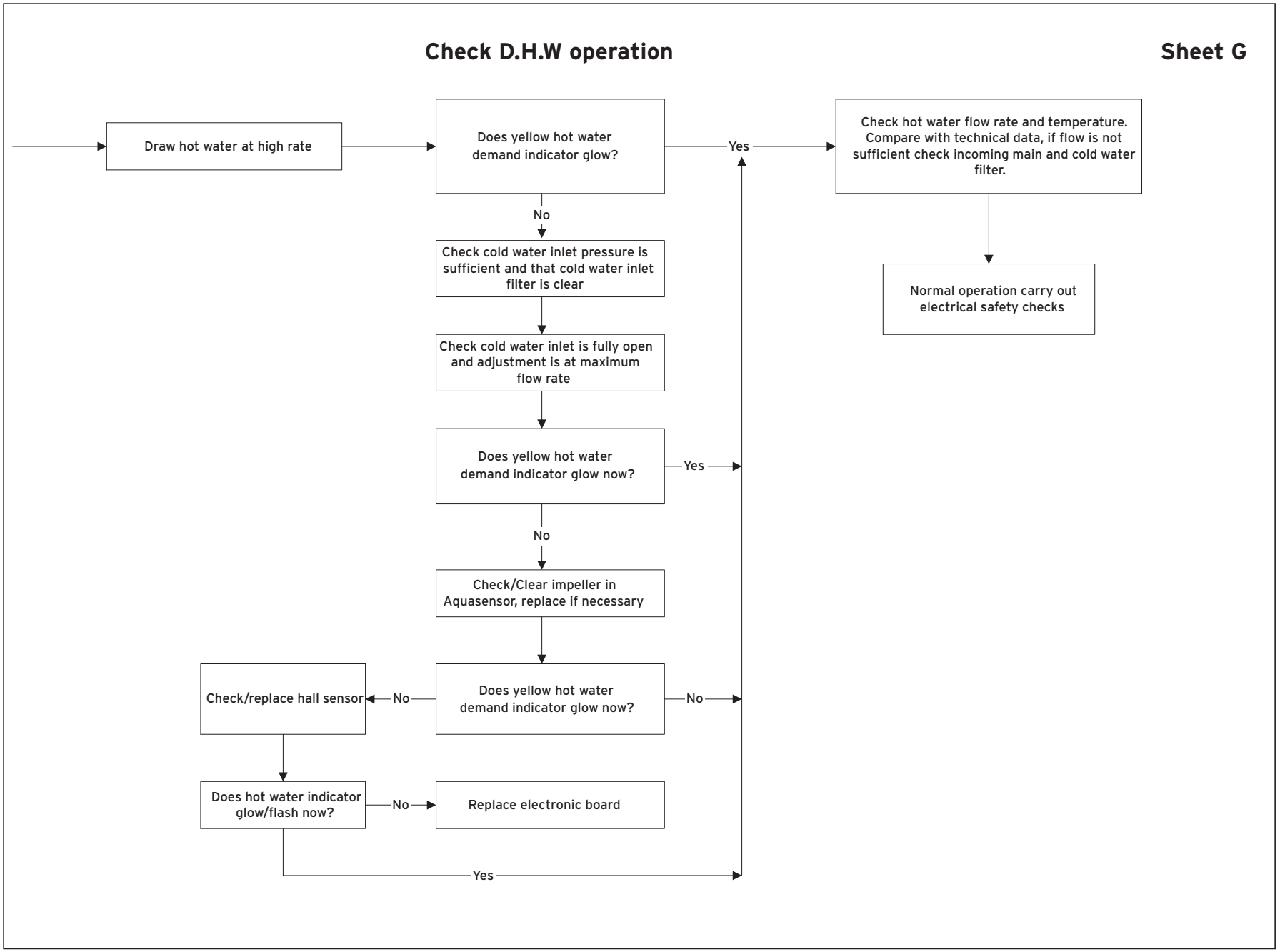



Check central heating and controls
Sheet C
Ensure that radiator temperature control knob is set to vertical position and that any internal timer (if fitted) is calling for heat
Does yellow central heating demand indicator glow?
Yes
No
Does yellow flame indicator flash?
No
Go to sheet D
Is 230 VAC present across terminals 4 and 5
Yes
Disconnect built in timer (if fitted)
Does ignition commence?
Yes
Replace defective timer
No
External fault: Check all external controls are calling for heat, replace or repair as necessary (see also note 1 sheet A)

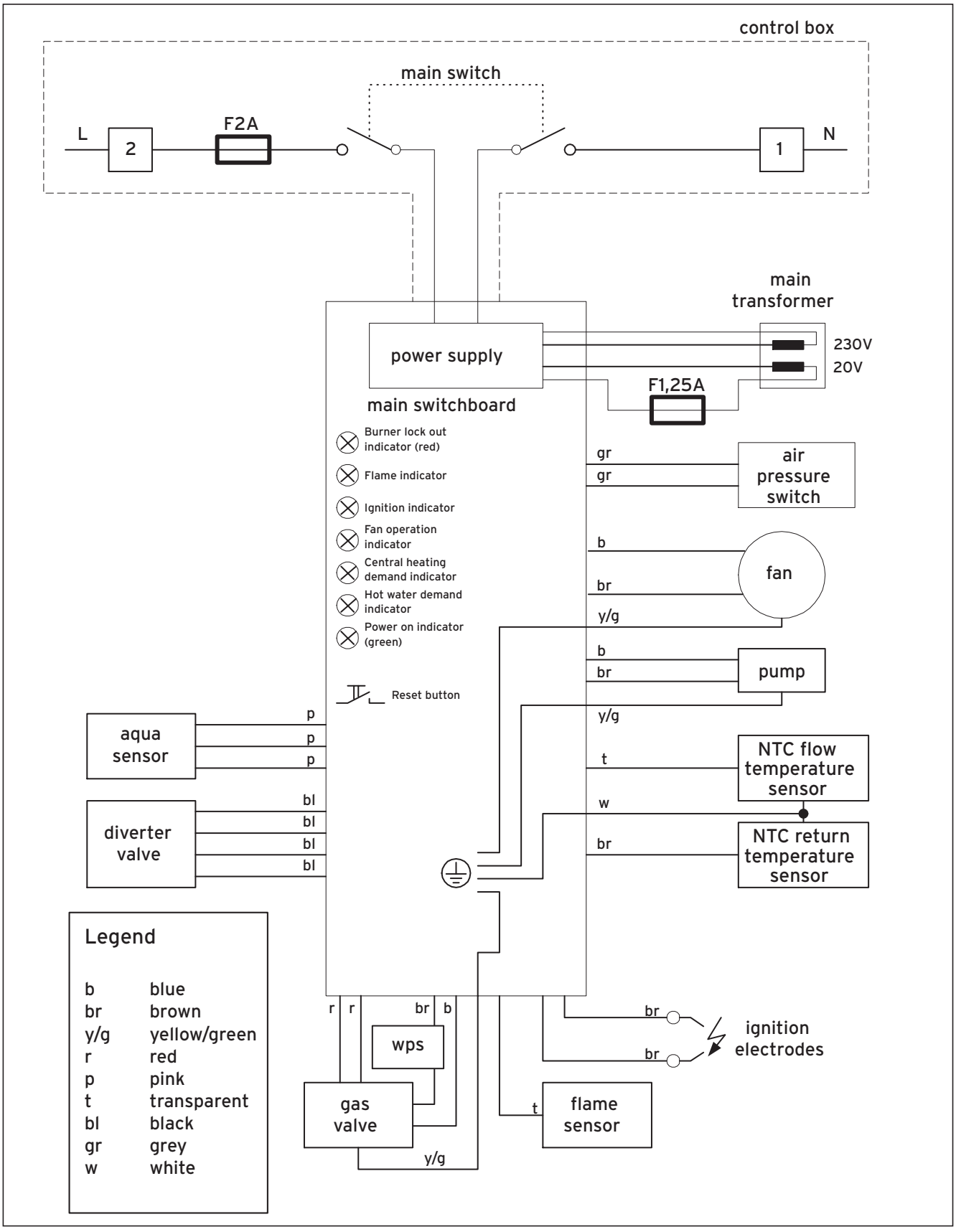

Check flue and ignition system
Sheet D
Does fan run after approx. 30 secs.?
Yes
Does the boiler commence ignition
Yes
Are electrodes sparking at the burner?
Yes
Go to sheet E
No
No
No
Does yellow fan operation indicator glow?
Does yellow fan operation indicator flash?
Check electrodes and electrode leads. Replace as necessary.
Yes
Yes
Yes
Check pitot tube (in fan outlet) and air hoses are not obstructed and correctly aligned. Check or replace air pressure switch.
Check air/flue gas system is correctly fitted and not obstructed
No
No
Does the fan run now?
No
Is 230 VAC present across fan terminals?
Yes
Check/replace fan
Replace electronic board
No
Replace electronic board


Check gas valve and central heating system pressure
Sheet E
Does burner light 1st attempt?
Yes
No
Is burner indicator illuminated?
Yes
No
Does burner shut down after approx. 15 secs.
No
Go to sheet F
Yes
Does burner light within 3 ignition attempts?
No
Reset boiler
Yes
Check gas supply
Does burner light?
No
Check/replace gas valve as necessary and check water pressure
Yes
Check burner pressure settings are correct
Yes
Does burner light?
No
Replace electronic board
Check flame rectification lead and electrode
Is burner indicator illuminated
No
Does yellow ignition indicator flash?
Check water pressure in central heating system, refill and vent. as necessary
Check pump is running?
Yes
No
Is 230 VAC present at the pump plug connection?
Yes
Replace pump
No
Replace electronic board

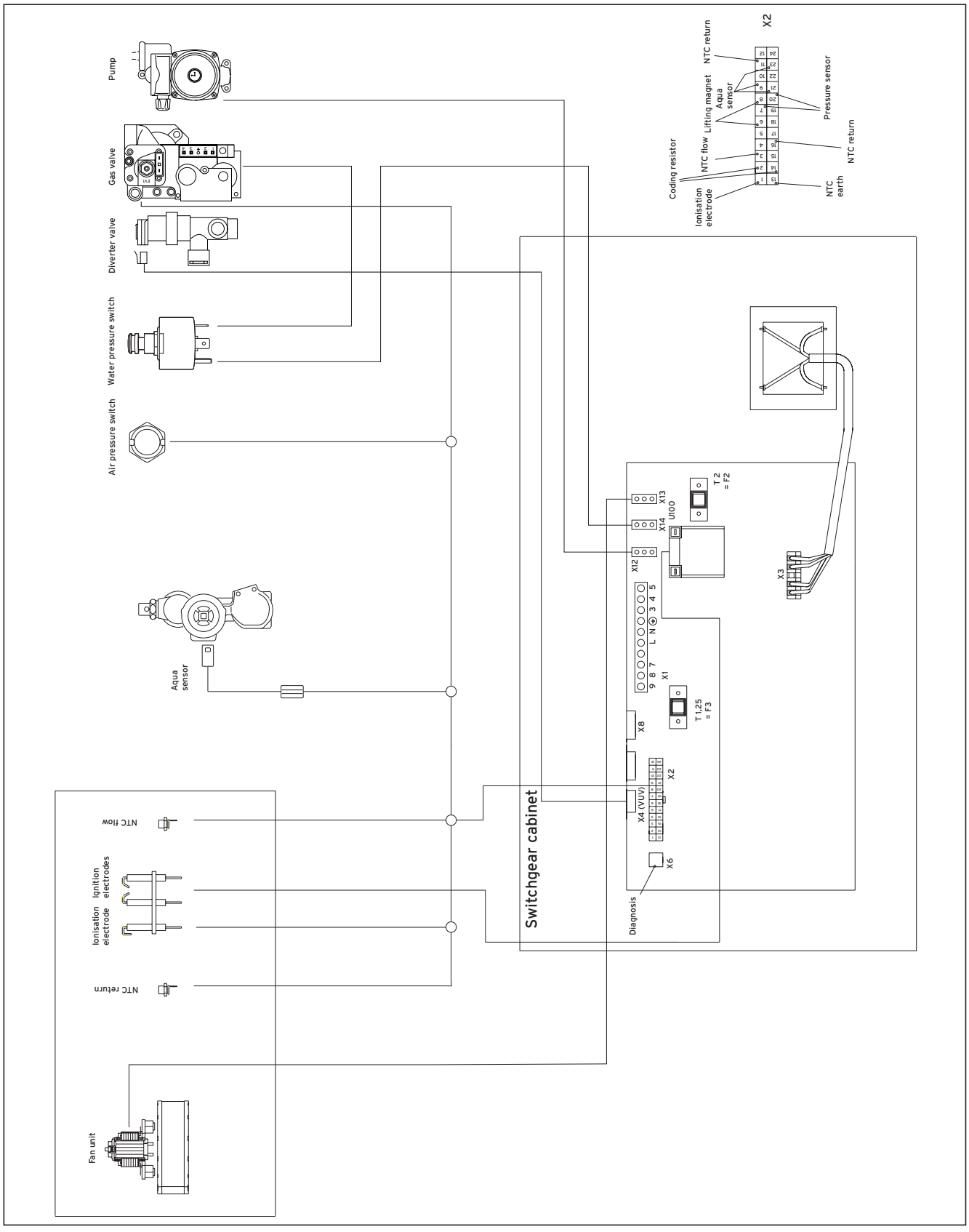

Check operation of burner and modulation
Sheet F
Does flame indicator glow and flames increase in size to full gas rate after approx. 2 mins?
Yes
Does burner flame modulate/ go out when radiator temperature control is turned left to the horizontal position at flow temperature of approx. 50 C?
Yes
Does heating flow pipe temperature rise?
Yes
Go to sheet G
No
Replace electronic board
No
No
Ensure flow and return service valves are open
Check partial load setting
Yes
Check operation of boiler in DHW mode, does flame increase in size to full rate?
Yes
Turn main ON/OFF control to the "0" position
No
Does yellow hot water demand indicator glow?
No
Insert a small screwdriver through the hole in the front of the diverter valve and hold blade lightly against spindle
Yes
Go to sheet G
Check connections and modulatior, replace gas valve if burner still fails to increase to full rate
Turn "ON" the main ON/OFF control
Does spindle move?
No
Replace electronic board
Yes
Replace diverter valve


Check D.H.W operation
Sheet G
Draw hot water at high rate
Does yellow hot water demand indicator glow?
Yes
Check hot water flow rate and temperature. Compare with technical data, if flow is not sufficient check incoming main and cold water filter.
Normal operation carry out electrical safety checks
No
Check cold water inlet pressure is sufficient and that cold water inlet filter is clear
Check cold water inlet is fully open and adjustment is at maximum flow rate
Does yellow hot water demand indicator glow now?
Yes
No
Check/Clear impeller in Aquasensor, replace if necessary
Does yellow hot water demand indicator glow now?
No
Check/replace hall sensor
No
Does hot water indicator glow/flash now?
No
Replace electronic board
Yes

11.1 Functional Flow diagram: turboMAX pro 24 E and 28 E



11.2. Wiring diagram: turboMAX pro 24 E, 28 E



BENCHMARK No. | | | | | | |

GAS BOILER COMMISSIONING CHECKLIST

BOILER SERIAL No. _____ **NOTIFICATION No.** _____

CONTROLS *To comply with the Building Regulations, each section must have a tick in one or other of the boxes*

TIME & TEMPERATURE CONTROL TO HEATING	ROOM T/STAT & PROGRAMMER/TIMER	☐	PROGRAMMABLE ROOMSTAT	☐
TIME & TEMPERATURE CONTROL TO HOT WATER	CYLINDER T/STAT & PROGRAMMER/TIMER	☐	COMBI BOILER	☐
HEATING ZONE VALVES	FITTED	☐	NOT REQUIRED	☐
HOT WATER ZONE VALVES	FITTED	☐	NOT REQUIRED	☐
THERMOSTATIC RADIATOR VALVES	FITTED	☐		
AUTOMATIC BYPASS TO SYSTEM	FITTED	☐	NOT REQUIRED	☐

FOR ALL BOILERS CONFIRM THE FOLLOWING

THE SYSTEM HAS BEEN FLUSHED IN ACCORDANCE WITH THE BOILER MANUFACTURER'S INSTRUCTIONS? ☐

THE SYSTEM CLEANER USED

THE INHIBITOR USED

FOR THE CENTRAL HEATING MODE, MEASURE & RECORD

GAS RATE		m^3/hr		ft^3/hr
BURNER OPERATING PRESSURE (IF APPLICABLE)	☐ N/A			mbar
CENTRAL HEATING FLOW TEMPERATURE				°C
CENTRAL HEATING RETURN TEMPERATURE				°C

FOR COMBINATION BOILERS ONLY

HAS A WATER SCALE REDUCER BEEN FITTED? YES ☐ NO ☐

WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED?

FOR THE DOMESTIC HOT WATER MODE, MEASURE & RECORD

GAS RATE		m^3/hr		ft^3/hr
MAXIMUM BURNER OPERATING PRESSURE (IF APPLICABLE)	☐ N/A			mbar
COLD WATER INLET TEMPERATURE				°C
HOT WATER OUTLET TEMPERATURE				°C
WATER FLOW RATE				lts/min

FOR CONDENSING BOILERS ONLY CONFIRM THE FOLLOWING

THE CONDENSATE DRAIN HAS BEEN INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS? YES ☐

FOR ALL INSTALLATIONS CONFIRM THE FOLLOWING

THE HEATING AND HOT WATER SYSTEM COMPLIES WITH CURRENT BUILDING REGULATIONS ☐

THE APPLIANCE AND ASSOCIATED EQUIPMENT HAS BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS ☐

IF REQUIRED BY THE MANUFACTURER, HAVE YOU RECORDED A CO/CO_2 RATIO READING? N/A ☐ YES | | CO/CO_2 RATIO

THE OPERATION OF THE APPLIANCE AND SYSTEM CONTROLS HAVE BEEN DEMONSTRATED TO THE CUSTOMER ☐

THE MANUFACTURER'S LITERATURE HAS BEEN LEFT WITH THE CUSTOMER ☐

COMMISSIONING ENG'S NAME PRINT _____ CORGI ID No. _____

SIGN _____ DATE _____

SERVICE INTERVAL RECORD

It is recommended that your heating system is serviced regularly
and that you complete the appropriate Service Interval Record Below.

Service Provider. Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the boiler manufacturer's instructions. Always use the manufacturer's specified spare part when replacing all controls

SERVICE 1 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 2 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 3 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 4 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 5 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 6 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 7 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 8 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 9 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

SERVICE 10 DATE
ENGINEER NAME
COMPANY NAME
TEL No.
CORGI ID CARD SERIAL No.
COMMENTS

SIGNATURE

833792_42 GB R3 03 2005 Subject to alteration

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